

Modern Health

MODERN HEALTH

A Handbook for Nurses and
Medical Auxiliaries

H. S. GEAR

M.D., D.P.H., D.T.M. and H., B.Sc.

Secretary-General, World Medical Association

Formerly Assistant Director-General

World Health Organization

and

P. J. CUNNINGHAM

B.A., S.R.N., S.C.M., H.V.Cert.

FABER AND FABER LTD

24 Russell Square

London

*First published in mcmxv
by Faber and Faber Limited
24 Russell Square London WC1
Printed in Great Britain by
Latimer Trend & Co Ltd Plymouth*

*H. S. Gear and P. J. Cunningham
1922*

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Preface

There is no greater change today in the training of nurses and other health workers than in the teaching of hygiene. Preventive medicine is now no longer considered to be the Cinderella of medical and nursing subjects but it is recognized as playing a vital part in protecting the health of the individual and the community. It is intricately bound up with the whole of medicine and the General Nursing Council for England and Wales accepted this fundamental development when it published its 1962 syllabus for the Examination for the Certificate of General Nursing.

The individual, be he sick or well, cannot be considered apart from his background at home and at work. He is a member of a family and a community and this will greatly influence his behaviour and reactions as an individual.

As every country is now involved to some degree in international medicine and health we have tried to show it in its broadest concept. Detailed descriptions of sanitation and the like will not be found in this book but the subjects still figure here for no-one can afford to be entirely ignorant of them and many may wish to work in countries still afflicted by insanitation.

This book is an attempt to meet a need for helping all those whose education and training require some knowledge of modern preventive medicine and health. These include nurses but also many forming the important members of the medical and health team known as medical and health auxiliaries.

We hope that this book will be a useful guide to both tutors and students and prepare them for work in this country or abroad.

Acknowledgements

We would like to thank the Comptroller of Her Majesty's Stationery Office for permission to publish Tables from *The Annual Abstract of Statistics* (No. 101, 1964), *On The State of The Public Health* (The Annual Report of the Chief Medical Officer of the Ministry of Health for the year 1963), *The Health of the School Child, 1962 and 1963*, and the Ministry of Health for permission to publish Schedules P and Q from their publication *Active Immunization against Infectious Disease*, Messrs. Allen and Hanburys Ltd., for photoprints of death statistic charts which appear in Appendices A and C, Miss E. E. Wilkie, B.A., S.R.N., Chief Professional Adviser to the Central Council for the Training of Health Visitors who read the manuscript and gave helpful suggestions and Miss Felicity Bowker, S.R.N., R.M.N., Tutor at St. Thomas's Hospital who also made suggestions.

For chapters 4, 5, 6 and 16 written by P. J. Cunningham, the following gave helpful advice: Miss M. A. Haggett, S.R.N., S.C.M., H.V. Cert., Nursing Adviser to the Greater London Council and Inner London Education Authority, on Maternal, Child and School Health; Dr. Audrey Z. Baker, B.Sc., M.R.C.S., L.R.C.P. on Diet, Food and Nutritional Conditions; Dr. Lynn Gillis, M.D., D.P.M., on Mental Health and also Dr. Patrick Riley, M.B., B.S.; Mr. F. L. Clark, Chief Administrative Officer, Public Health Department, London Borough of Islington on Health Services and their Organization in England and Wales.

Finally our grateful thanks are due to Mrs. Audrey Besterman who patiently drew the illustrations, to Miss S. Payne, Miss M. N. Han and Mr. C. J. K. Cunningham for secretarial and editorial help and to Mrs. H. S. Gear.

Chapter 1

The Human Being and His Development

Each human child born into the world to-day is descended from a long line of ancestors. First there was the ape-like man and his successors, the nomad and hunter, then the early settler such as the Romans found when they came to Britain. Finally came the ancestors of comparatively modern times when history was actually written down.

Long before birth has taken place the nature of the human infant has been moulded by his forebears and he receives qualities from them through his parents. Other factors which influence the child's nature are his embryonic existence within his mother's uterus and the process of his birth. He will be influenced for good or ill by what happens to him during infancy, his years of childhood and adolescence and he will be affected by his place in the family and by where he lives. All these factors play their part in determining what sort of individual he will be as an adult member of his particular society.

Anyone who is concerned at all with human health and medicine should be aware of this complex continuity, the stream of life, and what may make it change its course or lose its direction. Without such knowledge disease and disability cannot be prevented nor can people live their lives to the full.

INHERITANCE

In more ways than one, the parents of a child possess the key to its future. Inherited qualities are transmitted from parents to their

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children: and through the science of *genetics* we have some insight into how this comes about. In the nucleus of each *body cell* are the special deeply-staining bodies known as *chromosomes*. These in turn contain distinct particles called *genes*. It is through the genes of the male and female reproductive cells that the elements of inheritance are passed on to the next generation. Biochemists believe that certain complex chemicals compose these genes. Those labelled D.N.A. (de-oxyribonucleic acid) hold the secret of the transmission of heredity.

Certain characteristics clearly show the influence of heredity. These are the colour of the eyes and skin, the nature of the hair, the way the person is built physically and his mentality. Some ~~families~~ families are long-lived and the degree of longevity is an inherited characteristic as is also a tendency to certain diseases of which haemophilia is a well-known example. Even though the way a child is nurtured, educated and affected by his environment is important, the genetical factor operates in some way all through life.

But the combination of genes in reproduction from generation to generation is so complex that the results are of infinite variety. This is the reason that even within the same family there exist so many differences of appearance and character. One strange fact about inherited traits is that some are *dominant* and others *recessive*. A dominant characteristic occurs regularly and predominantly in successive generations. A recessive trait must exist in both parents to be repeated in the child.

Genetics is a complicated science which is now being vigorously studied to obtain more knowledge about man and his inherited qualities be they bad or good. Through this knowledge human health can be improved and disease and defect prevented. For example, marriage is not desirable between a man and woman who both have a family history of an identical inherited defect. However, in many cases, each may safely marry someone who does not possess this defect and the children will be born without it.

It is wise not to be too pessimistic in any discussion of the inheritance of disease or defect as, with a few exceptions, their transmission is not common. Transmission may occur when two

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first cousins marry each other if they both possess undesirable genes. There is, then, some genetic basis for the frequent opposition in society to such marriages.

Some diseases, such as diabetes, rheumatism, gout, certain allergic conditions, goitre and circulatory diseases occur in some families more than others. However, so common are these conditions and their genetic transmission is so varied that it is not justifiable to advise individuals against marriage and child-bearing merely on their account.

There is so little known about how defects are inherited and so much fear of causing abnormalities that the doctor is more often called on to encourage than to issue warnings. Fortunately the transmission of gross mental or physical defects is rare, especially now that marriages occur much more between families widely separated genetically. Formerly, the isolation of many communities led to much in-breeding and the inhabitants of a whole village might be related and share the same inherited defect.

In considering any problem of inheritance the call is for a careful personal and family history, and a precise check by the doctor of the occurrence, if any, of defect or disease that may have a genetic nature. Sometimes the family doctor may find the potential defects or diseases to be of a more complex kind so that specialist advice from a geneticist becomes necessary.

The following are some of the conditions which are largely or directly hereditary: albinism, some cases of short and long sight, some inguinal hernia cases, some cases of defective hearing, chronic chorea and certain nervous diseases.

Mutation is the term given to the sudden occurrence of a change in the nature of a gene which results in the appearance of some new hereditary condition. Mutations are generally harmful. The reasons for their occurrence are still largely unknown, but it is certain that radiation, natural, atomic and nuclear will cause mutations. This is why it is claimed that nuclear explosions would result in the birth of many children with serious congenital abnormalities or even the birth of monsters.

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THE DEVELOPMENT OF THE INDIVIDUAL DURING PREGNANCY

The future individual has been formed by the fusion of the reproductive cells, and has begun his journey towards adulthood; but during his growth and development within his mother's uterus he will again be influenced for better or worse. Thus to follow and assist the development of an individual during this phase calls for consideration of those conditions which may affect the growing embryo in its existence in and passage from the body of its mother.

The removal of any disability and the prevention or treatment of disease in the mother are necessary for her health, but are also for the good of the child. A foetal displacement or malpresentation is a threat to the mother but is equally dangerous for the foetus. If the lie of the foetus is corrected or a Caesarian operation is performed, both the mother and the child may benefit. Similarly, eliminating infection or treating malnutrition in the mother, especially when demands on her resistance and strength are increasing, are also in the interests of the new individual.

Antenatal care, so wisely sought by most mothers, is thus doubly effective in safeguarding the outcome of pregnancy and confinement for both mother and child. (See p. 48 et seq.)

CONGENITAL ABNORMALITIES

Apart from inherited defects of the kind already mentioned, a number of abnormalities may arise in the foetal period or during a difficult confinement. Fortunately, syphilis of the mother as a cause of serious congenital abnormalities in her offspring is now rare in countries with effective venereal disease services. Rubella (German Measles) and some other virus diseases during pregnancy may cause congenital malformations. Certain other infections and metabolic disturbances may more rarely be responsible for similar mishaps.

Though congenital malformations are fortunately rare, they are of an infinite variety, since most organs and tissues may be affected.

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ted. More common ones are those of the heart, for example, a defect in the septum, or of the great blood vessels, or of the eyes, ears or the limbs. The exact cause of such failure in normal growth is not always known.

A recent disturbing form of congenital malformation has been that due to the drug, thalidomide, when taken by pregnant women. The alarm caused by these cases has been widespread, leading to stricter supervision of new drugs, and a greater awareness of the damage to the foetus which may follow if some drugs are taken by pregnant women.

INFANCY

During the first year the child is completely dependent upon its mother, but even in this period of helplessness its growth and development are proceeding at an astonishing rate. At a year old the child has usually trebled its birth-weight, become lively and active, and with very rare exceptions will have been weaned and have adopted the habits of feeding of his future life. His character and personality are being formed both consciously and sub-consciously.

Partly because the child is so immature and dependent, partly because his whole personality and anatomy are changing so rapidly, and partly because physical and mental characteristics and strengths are only just forming, the first months of life are the most hazardous. This is especially so in communities where conditions are primitive and insanitary. Here the infant mortality rate (i.e. the number of deaths under one year per thousand live births) is often called the best index of the health of a community. Within the first year, the first few days and then the first month are the most critical. The common causes of death are congenital malformations and birth injuries, and respiratory and intestinal diseases: obviously, premature babies are especially vulnerable and have a high mortality rate.

Parents worry most about physical defects or disease in their infants. It is now recognized, however, that damage done to the

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emotional and mental condition and personality of an infant by neglect or ill treatment in its first two or three years, is equally or even more serious for the child. Indeed many child health experts and psychologists claim that these very young and apparently insensitive beings suffer permanent harm to their emotions and mental health if they are not given full mother care and love. Maternal deprivation, as it is called, is a most serious handicap to the whole future development of an individual. Today this early phase is carefully watched by the wise mother and father who are able in most communities to find nurses and doctors to give advice and guidance such as, for example, that given at the child welfare clinic. The nurse is one of many influences on the child. In a few cases she may be the chief or only guide a mother has, so she bears a heavy responsibility. (See p. 53 et seq.)

CHILDHOOD

During the first two or three years the mother is the main influence in giving her child a good start in life, physically, emotionally and mentally. Her importance continues through childhood and adolescence, both because of her own part in the individual's development and through the way the good wife and mother sets the standard for the whole family.

As the child grows and his activities increase, he is greatly influenced, especially psychologically, by others. After his mother, his father is next in importance, but others influence him too, brothers and sisters, the wider family circle, the school teacher and classmates and his friends. In a strictly physical sense, the growing child is most fortunate in a family properly fed and housed and living in a neighbourhood and country with equable climate, pleasant surroundings, and which is free from gross communicable (and tropical) diseases. A child is not so fortunate who has been born into an unhappy or broken family, one which is poor and so has inadequate or unsuitable home conditions and food, one which lives in a slum or insanitary neighbourhood, or one which is in an environment where communicable diseases

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are prevalent or even where there is social misery and political and economic insecurity and perhaps violence.

Childhood is obviously a period of physical growth and change, but these sometimes divert attention from the great development of mind, personality and character, which is going on at the same time. It is a period when sound habits, good food, exercise, playground activity and outdoor pursuits are especially valuable. These help towards the growth of a strong and well-formed body, a healthy skin, well-toned muscles, full dentition and the easy, graceful movement of the normal, healthy boy and girl.

The companionship of others is equally necessary to encourage the making of adjustments and the ability to co-operate with other people. This is the best preparation of the mind and emotions for the critical time of adolescence.

This is the time too for the individual to learn by example how to achieve some proper place in our civilization. He learns from all his circle at this stage, primarily from the father and mother, but later from teachers, friends and companions. He has to be shown how in society he must work to earn his daily bread, make his home and found his family. He must become aware of the satisfaction of fruitful occupation, and service to others, and of constantly increasing his interests.

ADOLESCENCE

The physical and physiological changes which herald sexual maturity and form the period of adolescence are distinctive. They may affect the future health and happiness of the individual.

In most countries and races, adolescence appears two or three years earlier in the female than in the male. Recently its onset has been occurring earlier in both sexes. It is not unusual now in highly industrialized communities for girls from eleven to thirteen years and boys from twelve to fourteen years to show the signs of adolescent change.

The adolescent shows marked physical changes. Apart from considerable growth in size and weight, the secondary signs of

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sexual development occur to differentiate the sexes even more clearly. It is, however, change in behaviour which attracts most attention. The individual shows a new attitude to others, especially towards the older generation or to anyone in authority such as his parents, teachers or employers.

All these changes have been produced by the profound hormonal interactions which convert the child into the adult and prepare him or her for the functions of parenthood.

New habits develop and indeed the personality itself changes. The adolescent, usually in an uncertain and hence unstable way, is seeking wider experiences, desiring to become an independent individual. His uncertainty tends to sensitivity. There is often suspicion of correction or control.

There is a deep-seated urge to associate with other adolescents and be accepted as an equal or even a leader. There is reaction, often inconsiderate, against the previously happily settled family and home.

Each generation experiences basically the same form of adolescent behaviour however varied the outward expression of exhibitionism, experiment, or even frank aggression and rebellion against established authority may be.

The adolescent who has been fortunate to grow up in a happy family, receiving early mother-love and later companionship of father, brothers and sisters, is unlikely to become extreme in his behaviour or unreasonable. He changes and he loosens his ties with family and home but he retains his basic affection and loyalty, and keeps his behaviour within bounds, even though giving way to high spirits and bravado.

Both the physical and emotional development of the adolescent are aided by some preparation for it on the part of parents. They must decide to be tolerant and attempt to divert the child discreetly into groups of his own age and kind in whose company he will find examples of good sense, interesting occupation, recreation and hobbies. Team games, camping, holiday jobs, and music in groups are among the activities demanding vigour, competition and companionship, all satisfying to the adolescent seeking expression and yet still a bit uncertain of his direction. Such demanding

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occupation too is the best insurance against the anti-social behaviour of the adolescent. A combination of outdoor sport or recreation with indoor hobby or group activity gives physical and emotional stimuli which set the adolescent body and mind along the right path to healthy and happy adulthood.

The present anxiety in several countries about *juvenile delinquency* is in part a reaction to a true increase of petty thieving, gang violence and vandalism, but is also in part due to a greater awareness and publicity. Much of this unfortunate behaviour is traceable to unhappy homes, especially those which have had some major disruption such as a divorce or drunkenness or similar disaster. There is also the problem of the adolescent in the affluent society who has not the judgement to know how to use his easily acquired wealth. However, in spite of these difficulties, most individuals pass from childhood through the physical and emotional stresses of adolescence to a responsible adulthood.

ADULTHOOD

An individual is an adult for most of his life, usually for about forty or fifty years after he has passed the stage of adolescence, and up to his old age or senescence. In the eyes of society and the law, an adult individual is seen as independent, mature and responsible. However, in terms of health, vigour and wisdom the adult of the late teens and early twenties is a very different person from one of the fifties and one should consider some of the changes which occur, physically, mentally and socially as the adult grows older.

The young man or woman emerging from adolescence is at his or her peak of physical energy and potential. This is allied with an optimism of spirit though it may be marred by occasional moodiness. The infectious diseases which lurk in the background of childhood rarely threaten the adult. Indeed the young adult, apart from accidents, is freer from major threats to health than those in any other age group: and under favourable circumstances he should be in the most enviable condition of physical and emotional vigour and health.

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Assuming he is not an unlucky victim of some unusual disease, this young individual becomes of medical concern mostly through his emotional reactions. He may be unhappy in love, reckless in relationships with the opposite sex, foolish in convivial gatherings, excessive in bravado or resentful in frustration and thus get into trouble with his superiors. His problem may not be strictly medical in form, but it frequently has its origins in the unhappy events of earlier family life. It may also prove to be the beginnings of later medical and psychological troubles.

Many later habits, both physical and social, date from young adult life. A happy marriage and the start of a family will be the sound foundation of lifelong health and satisfaction. Success at the beginning of a career and good friends also prepare the way for a full life. Regular exercise, moderation in food and drink and varied interests are all to be cultivated in early adulthood as safeguards against many of the ills of middle and old age.

The insidious surrender to the easy life, lack of exercise, and excessive smoking, drinking and eating, initiate many chronic diseases. Some cancers, alcoholism, heart and circulatory diseases, especially coronary thrombosis, fatty malnutrition and chronic bronchitis so frequently follow foolish extremes of the early twenties and thirties. Then too the emotional troubles of the late fifties and sixties, loneliness, depression and boredom, are only too frequently the final symptoms of earlier mental and psychological bad habits or unfulfilled needs.

The effects of behaviour in early adulthood are felt in the late forties and fifties when the ageing individual faces new conditions of health and happiness. Physical vigour is declining, but frequently mental and emotional satisfaction, if less ecstatic, is greater and more enduring. Intellectual interests should be wider, human relationships richer and the esteem of colleagues and friends more certain.

On the other hand, there are difficulties which may make this period disastrous. The chronic degenerative diseases take their toll so that death and crippling are caused by the cancers, heart and circulatory diseases and chronic respiratory conditions. Alcoholism reveals itself, frequently in a destructive, irreversible

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form. Rheumatism and osteo-arthritis may cause pain and misery from loss of movement.

OLD AGE

Old age is a condition and does not necessarily depend upon a person's chronological age. Some people are old in mind, if not in body, at fifty, while others of the same age may be quite the reverse. There are also the fortunate few who keep vigorous in every way throughout their life.

Modern civilization with its efficient public health and welfare services is keeping alive many people whose minds or bodies are waning. Thus we are more conscious of the problems of old age than ever before.

Some old people are fortunate in that their inheritance and previous personal and family experiences have left them reasonably healthy in body and mind, and, most important, in a position where they are wanted and appreciated.

However, many old people are often found to be unhappy. Family life in our modern civilization has little place for the aged. Homes, whether in a flat or a house, are too small to have room for any but the immediate members of the family. Then the smallness of most families and their restless social interests leave no place or function for the grandparents.

Obviously old people become less vigorous physically, their bodies lose fat, shrink, joints become stiff and they feel cold more unpleasantly. Great misery is caused by joint and bone disease, heart or brain circulatory thrombosis or by a failure of vision, hearing, or even the nervous system. Perhaps the most pathetic are those whose minds and spirits decline because of neglect and loneliness and who feel unwanted and finished.

The study of the health and welfare problems of old age is known as *geriatrics*. This art, allied with common sense and ordinary human kindness, is showing that much can be done to help the elderly to live happily or at least more easily. Old people clearly need some special care physically. Besides the essentials of shelter, simple food and adequate clothing, they require more frequent

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medical attention if some sign or symptom of ill health appears. Frequently treatment will aid their vision, hearing, digestion and conditions of the joints or skin.

But to the individual who has reached his declining years, the most vital needs are for the love and respect of others and to have a purpose for living. In part, earlier preparation helps to meet these needs. Indeed everything from childhood onwards which means health and vigour is an investment for a satisfying old age.

Inherited qualities count for much in reaching and living in old age with a healthy body and undimmed mind and spirit. A childhood and adulthood lived to some purpose and with wise habits and standards of exercise, food, recreation and companionship, reduce the hazards of physical and mental deterioration. They also establish occupation and hobbies which give zest to life and an eagerness to look forward rather than to pine hopelessly for the past.

But old people, even if free of disability, often need a little help and a wise medical or nursing adviser can do a great deal for them. Apart from strictly medical and nursing attention, the doctor or nurse is often the person best placed to guide old people in their search for companionship or for some occupation to guard against the destructive feeling of being unwanted.

Most of all, there is the responsibility of the younger generation, especially of those with older members in their families, to understand the needs of old people. To bring them into the family circle or local community gives the elderly a great sense of belonging and of usefulness. Then, as most communities are discovering, these old men and women have much to give in return. Their remaining energy and skill and their sensitive feeling for the very young are all of value.

It is those who are crippled or even bed-ridden who are to be pitied. Their care means unbearable cost and time for most families and too few communities have enough accommodation in hospitals or other institutions to give them nursing and medical care. The slow wasting away and decline into death is a pitiful end to many such human lives.

Chapter 2

The Family and the Community

THE GOOD FAMILY AND THE GOOD HOME

In the first chapter, it was shown how the growth of an infant to manhood is much influenced by the love and care he gets from his mother, father and other members of his family. The relationship which he has later with his school and neighbourhood were also mentioned as important in determining his future physical and emotional health. The importance of these factors has led to more attention being given in recent years to what makes a good family.

The family means different things in different countries and societies. In most communities of Western Europe and North America the family centres on father, mother and their children. There should be at least two children to give them the best opportunity in life. Occasionally one or more grandparents will be in the same household. Also there is usually close friendship with one or more uncles and aunts and their families.

In other communities and countries the family is different in both size and complexity. There are countries where a man will have one or more wives living with their respective children in one large household. There are others where the inter-relationships of a large circle of near and distant relatives is so continuous and close that the father and mother are less powerful in their influence on their children. A common example is where a grandfather is the patriarchal head of a large family of sons, daughters-in-law and many grandchildren and dominates the behaviour and attitude of them all.

A happy marriage is a key to a happy home: and the mutual

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trust which this engenders can overcome many disadvantages. An inadequate house or flat, or even difficulties in making ends meet are more bearable and less harmful if the mother and father are content and loving in their relations with each other and their children.

It is almost automatic that in such a family there will be a high moral standard. There will be give and take between the members, and eager interest in a variety of hobbies and activities. There will be pride in person and in belongings. There will be warm relationships with others of like ideas in the community.

A family that occupies a house or flat which gives it some individual privacy is one step on the way to a happy home. It will also need the essentials of healthy living, such as separate accommodation for the sexes and at least a living room, kitchen and bathroom in premises free from defect.

The neighbourhood is important too. A pleasant community housed in good buildings with ample space, light and air, and within reach of recreation grounds is ideal. As well as the physical advantages, these factors contribute to social confidence and freedom from anxiety.

UNFORTUNATE FAMILIES

However, it is not the happy families, living in good homes and neighbourhoods which concern the doctor, nurse and health worker so much as the unhappy ones.

There are many reasons why some families are unhappy.

1. There may be internal tension or open hostility between father and mother. They quarrel or show other signs of lack of mutual respect and love. Sometimes this leads to divorce or separation: and the distressing case of the broken family then follows. The children in it suffer most, as they are denied the essential home and happiness given by both parents in a happy family. Their future is penalized, for they are liable to suffer emotional and mental distress, not only immediately but in later years. In such broken homes and unhappy families there is often a history of juvenile delinquency and adult misery and crime.

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2. There may be some chronic defect in father or mother such as alcoholism, or there may be a criminal tendency causing trouble with the law, or money troubles may produce tension and antagonism.

3. There are the tragic families where the mother or father has died, and the remaining parent has to struggle to deal with the immediate practical routine of housekeeping as well as earn the daily bread. Not enough time or energy remains to give the children all the care and love they need.

4. The misfortune of a serious illness or accident to one member of a family can prejudice their whole way of life. Loss of income, heavy costs, or disruption of the home are burdens which result from such a catastrophe.

5. There are the poverty-stricken families living in squalid slums. Everything seems against them. There may be unsuitable or even insufficient food, in some countries no schooling for the children, and no place in the neighbourhood other than the streets for play.

6. In contrast, and an apparent paradox is the family which earns enough and lives in a flat which is adequate but has no peace or quiet. Such families are found increasingly in the vast blocks of flats being mass-produced to accommodate the workers in the most industrialized cities today. Their community is impersonal: hundreds of families live in identical flats and one is strongly reminded of life in a beehive. Noise is continuous in such communities. There is little neighbourliness because of the very size and restlessness of the community. There is little outlet for play, exercise or recreation, with the result that families have the physical essentials of shelter and services but live frustrated lives. The adolescents, especially, are at a disadvantage, as there is no place or space for their games or group interests. Much gangsterism and delinquency may result.

COMMUNITY CARE

Awareness of the need for more than just creature comforts has given rise to the newer type of community, housed in flats but given much else too. There is an attempt to provide some archi-

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lectual variety, space for games, children's playgrounds, shopping centres, recreation halls, etc. Community planning and care have thus come to the fore in giving better health and welfare, both physical and social, to the families of today in many countries. The great experiments in the Scandinavian countries are well known. They were based on the discovery that families which had only the essentials of living quarters and services of water, light and sanitation were not contented people. This has resulted in an effort to find new ways of meeting the emotional and social needs of families brought together in massed urban communities.

It is clear that, today, good medical care and the promotion of health entails more than just preventing disease and insanitation. Slums certainly have to be cleared, but a community must also be given an opportunity to educate itself and suitable outlets for occupation, service and recreation. A community, to be a satisfactory one, must be able to cope with ignorance, delinquency, crime and such other social problems as broken families, alcoholism and suicides.

Neither the law nor charity can buy happiness and satisfaction for families and communities. They themselves must win it by their own work and effort and by making some sacrifices. It has been shown, time and again, that conscious, determined, formal planning is not enough to make a community happy. Both official services and voluntary effort are needed to make a good community.

The doctor, nurse and health officer are valuable members of any community. They give important service in dealing with the medical and health problems, the prevention of disease, the physical factors of housing and its services, and the care of the sick and infirm. But professionally they are also involved in many other community problems which include the care of the elderly, the difficulties of adolescence, alcoholism, broken homes and illegitimate births. They also have personal responsibilities. They are professional and educated people, and are likely to be accepted as leaders and as sources of advice in much of the life of the community.

A vigorous, happy community has many voluntary activities, ranging from recreation and entertainment to welfare and educa-

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tional services. There may be crèches, first-aid teams, vocational training groups, home-visiting for sick and old people, youth clubs and many other activities in which the doctor and nurse are welcome.

The good community depends upon public authorities to a great extent. The money for large housing schemes, and for roads, electricity, water and sewers must usually, but not necessarily, be found in cheap public grants. The general supervision of these services is the duty of some local authority, city or town council. However, the happiest and most vigorous community is the one where its citizens do most things themselves, and where voluntary agencies are strong and efficient. Even in countries which have public hospital and medical services, there is much need for voluntary service in hospital visiting, rehabilitation work, provision of special equipment, etc.

NATIONAL COMMUNITIES

The first type of community was the gathering of a few families of farmers or fishermen or simple traders in a small village. From these humble beginnings, man has progressed to the great cities or vast conurbations, as they are clumsily called, which we know to-day. This means that man has become dependent on a most complicated relationship between town and country, and between one country or region and another. It is only through this interdependence, by trade, shipping and air transport, that food, clothing, farm products and manufactured goods can be provided for all the communities throughout the world. In this economic and social sense, in spite of political differences, the whole world is moving towards integration and unity. All who are interested in health must therefore recognize that the complexity of human communities today concerns them too.

The phenomena of industrialization and urbanization, which commenced in Western Europe and North America, are changing the whole face of the world. The ways of life of millions of people in Asia, Africa and Central and South America are being altered

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in a few short years as compared with the slow evolution which has taken place in many other countries. The nuclear age is accelerating the degree and pace of this change. But as the population of the world increases so do demands for material comforts and the world's vegetable and mineral resources are being depleted.

There are many unhappy consequences of a regional or world community growing too rapidly and haphazardly. Only well-administered states are able to increase their various public services (housing, water, sewerage, transport, etc.) quickly enough to keep pace. Any failure to provide these basic needs of a civilized community is to precipitate, not only starvation and disease, but also social and political disturbance. Much of the world's population still exists in a primitive social condition though modern public health, by mass disease control, has allowed its numbers to grow rapidly. This problem of growing numbers living in bad, insanitary and depressing towns or villages, but becoming socially and politically restless, has world-wide implications. Doctors and nurses, in particular, should be concerned, because many of them may take part in international health programmes, or deal with foreigners in their home communities. Some knowledge of the world community is necessary.

Failure to allow for the differences in people and their social systems can do more than obstruct plans for better community and health services. It can arouse suspicions and antagonisms which may lead to passive resistance or even violence.

The physical differences of *race* are to be seen in such features as shape of skull, nature of the hair, facial appearance and the colour of the skin. However, physiological and psychological variations have not been adequately investigated. In any case, they are so complex that it is rarely possible to determine the effect of such factors as climate, nutrition, environment and education, let alone race.

Social forms are important. These range from the primitive small tribe with a few huts under a headman, to the complex city of the modern industrial state.

The different **languages and dialects** of the world number several thousand. In dealing with the social and health problems of any

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people it is axiomatic that their own language should be used. Where medical workers live temporarily amongst people who have their own local dialect, it is clearly impossible, in most circumstances, for them to master it: but certain languages, because of the large numbers who speak them and their cultural importance, are becoming supreme. The United Nations Organization has accepted this by using English, Chinese, French, Russian and Spanish.

Religion has always been one of the most powerful forces in social life. Most religions have become associated with ritual and prescribed codes of conduct. Primitive peoples have a variety of beliefs in the supernatural, mostly in powerful malignant demons. Some of them believe in medicine men and witch doctors claiming powers of removing or laying on curses, detecting evil spirits or curing the afflicted. From such early beginnings have emerged more complex religions and philosophical systems. Today, the great religions are Christianity, Islam, Confucianism and Buddhism.

Apart from these differences between communities, there are the effects of the general regional *topography* and *climate*. Climate, particularly can be a critical factor in the wealth and well-being of any community.

The World has five basic regions. There are the two Arctic zones (North and South), the two temperate zones (North and South) and the equatorial or tropical zone. There are distinct differences between these zones in their conditions of health and disease. Most obviously, communicable diseases, especially those carried by insects or infected food and water, are more common in the warm, humid tropics. In the extreme cold of the arctic zones, most forms of communicable disease do not exist. The temperate zones fall in between in their susceptibility to communicable disease, but are generally the most comfortable for vigorous physical and mental activity.

Climate and environmental conditions of importance to health are also affected by factors other than geographical latitude. Large masses of land and large masses of water play an important part in determining the nature of regional climates.

We are more conscious today of the effects of climate on health

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than even fifty years ago. It is now known that most ill health in the tropics is due to communicable disease, as their temperature and humidity provide the best conditions for the responsible micro-organisms and their insect carriers to thrive.

But there is more to the association of climate with health than the story of communicable disease. Human beings are directly affected by sunlight, temperature and humidity and the general variability of a climate.

Chapter 3

Personal Attitudes and Practices

In the present chapter the common practices covered by the phrase, personal hygiene, or individual health practice, are simply described. In other chapters such as those dealing with diet and infections, there are also many related facts. Indeed in a manual on health each subject inevitably includes matters concerning individual habits of health.

Modern personal health practices differ from those affected by prejudice or ignorance in that they can usually be based on the scientific principles of physiology and medicine. The reader who recalls his or her knowledge of these subjects and applies it with common sense, cannot but be guided aright in preaching and practising personal hygiene. Nevertheless, the principles are to be followed sensibly. The human body and its functions are not rigid and machine-like. There is much variation in type and behaviour. No two individuals are exactly alike in their anatomy and physiology; therefore to demand exact patterns of health practice for everyone whatever his or her age, race, or occupation is unwise. The broad principles are, however, known and if followed offer the best chance of healthy and vigorous life.

BODY CLEANLINESS

Cleanliness of the body is now accepted as essential for both health and aesthetic reasons. It has several health advantages; most important is the protection it gives against skin, hair and even certain eye infections; and in the case of the hands against convey-

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ing infections to the mouth either directly or through food. It eliminates such body parasites as lice (pediculosis) and scabies. It offers the skin the direct benefit of the stimulus of air and light. Then the act of cleaning the body by whatever means, washing with soap and water or with lotion and followed by drying is also a vigorous stimulant to the skin and subjacent tissues. Thus these tissues are kept healthy.

Cleanliness of the body requires the removal of dirt and excess secretions from the skin and its glands. It requires similarly the cleansing of all hair, on the head and elsewhere. These requirements are doubly necessary where the individual is exposed to contamination of his skin by dirt, oils, paints, grease or similar substances. Then too when work, exercise or climate has caused the skin to perspire excessively, washing of the body is also more than usually desirable. In warm climates frequent washing by shower or bath is more necessary than in temperate or cold countries. This practice is the best safeguard against the many skin and hair follicle infections prone to occur in warm and humid conditions. The hair of the head, axillae, and pubic areas, and the skin of the feet especially need such attention.

It is now customary to wash the hands and face with water, warm if possible, and soap at least once daily. Bathing either by shower or in the full bath daily is desirable but for most peoples in all but the very advanced countries is still unattainable. Few of their modest dwellings have baths and may not even have piped water. Then soap, and fuel for heating water are frequently beyond their means.

Equally as important as the act of washing or bathing in removing dirt and perspiration and in stimulating the skin is the act of drying. A dry skin, especially in warm climates, is also much less likely to develop infections and irritations, so the frequent use of good textured even hard towels in drying the skin is well advised. In the tropics, even if washing with water is not always possible the process of drying the skin is healthy and comforting.

Apart from the function of removing dirt and other material from the skin full bathing has a beneficial effect on the whole body. Warm baths are soothing. Cold bathing or showering is invigora-

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ting. It stimulates the action of the subcutaneous muscle fibres and even the full muscles themselves and blood circulation throughout the body, and the cold itself acts on the nerve receptors in the skin. Such generalized stimulus results in the metabolism as a whole being exercised—a most healthy process. Hence the value of cold showering in the morning and its especial value to those needing maximum bodily efficiency like athletes and soldiers.

Naturally basins, baths or showers, and water, soap and towels should themselves be clean. Dirty and insanitary bathrooms and bathing linen especially when communally used can themselves be the source of skin infections.

Apart from this general need for personal washing, special care, daily if at all possible, is advisable for skin, hair, nails, hands and feet, mouth and teeth.

The **skin** is a remarkable organ in its functions of protecting the body from infection and injury, and assisting in the maintenance of the physiological body temperature. It is tough, impervious and elastic. Its sweat glands, hair and nails are special protective features. It requires care to be kept healthy and free from disease. Here it is necessary to say that daily or other regular cleansing of the skin with soap and water is not always sufficient to maintain its healthiness. In very hot and humid regions, as already mentioned, the skin is especially exposed to infection. In very dry climates, even indoors when the dryness is produced by inefficient air-conditioning, the skin suffers damage. Then in many sunny areas, and not only in tropical lands, ill-advised sun-bathing or exposure of limbs or head to direct sunlight leads to the skin changes popularly known as sunburn. Even the man in the street knows that people differ in their reactions to sunburn. Excessively fair people, lacking protective skin pigment, 'burn' easily and may suffer severely with both local discomfort and general feeling of being unwell due to the toxæmia caused by the skin changes.

Prudence therefore calls for the protection of the skin from excessive dryness by applying simple creams to the worst affected parts, namely the exposed face and hands. Here it is to be mentioned that too frequent washing of face and hands, as every woman knows, causes damage by scaling and cracking of the skin. This

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especially follows the use of too much soap which removes not only excessive perspiration and skin grease but extracts the normal skin secretions of the sweat glands needed to keep it supple and protected. Prudence also calls for some thought, especially for those travelling in new climes, or having a change of outdoor life, about the rate and degree that exposure to sunlight is accepted. Gradualness with a watch on results is the best practice, protecting the exposed hands, face, and trunk with recognized makes of lotion and cream.

The hair benefits from frequent washing, a practice which is obviously not always acceptable to women wishing to follow hair styles. Also the axiom that the shorter the hair the easier its health care, although a wise one, is not likely to be always followed. So combing and brushing with or without washing and shampooing are valuable means to keep the hair of the head clean and healthy. It is common sense to use wide, blunt-toothed combs, and brushes with stiff bristles. Though vigorous combing and brushing are necessary they must avoid tearing out hairs or damaging the skin. Then it is equally obvious that both brush and comb must themselves be kept scrupulously clean and not shared with others. Infections and parasites are too easily spread otherwise, and taking root in the hair are frequently difficult to dislodge.

The care and cleanliness of the hands deserve special attention not merely because of their own importance to each individual but also because hands can spread infections. It is obvious that disease organisms present on the hands can be scratched into the skin, infect cuts or injuries or be conveyed to the mouth or food. Infected hands are not only dangerous to their owner, they may be the source from which others are infected. Much gastro-enteritis disease including the typhoid infections and some of the food poisonings frequently owe their spread to hands contaminating food or drink. This but emphasizes the responsibility borne by all food handlers, such as cooks, butchers, bakers, and other traders in food to be especially scrupulous in the cleanliness of their hands. An even more special case is that of the nurse, physiotherapist or doctor. Not merely must they maintain the most careful cleanness of their hands, but they should avoid handling any material directly

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such as soiled bandages or dressings from which such organisms as the pyogenic ones may be passed to cause serious infection in wounds, cuts or scratches of patients.

The so-called hygiene of the hands of all medical and nursing personnel as with all their personal habits is exceedingly important in preventing hospital and operating theatre infections. These infections have too frequently reappeared in recent years following the development of strains of staphylococci resistant to penicillin.

It is clear that the **nails** deserve careful attention as dirt is so liable to collect in the folds under their extremities. Close cutting of nails helps both to prevent splitting or other injury and facilitates washing and scrubbing to remove dirt. Here it is appropriate to say that obvious dirt is not necessarily by itself harmful. Harm is done by certain types of chemical or physical irritants and by infective micro-organisms. However, dirt is something of an indicator. If visual dirt is removed by washing or scrubbing then it is probable that harmful agents have also gone. Conversely, however, it is to be remembered that infections, particularly pyogenic organisms, may exist on the skin especially of the hands without necessarily revealing themselves in any local way, such as an ulcer, or pustule. Nevertheless, such hands can convey their dangerous organisms to others or to food. But certainly the existence of sores (papules, ulcers or infected areas) must be accepted as additional reasons for care against conveying infection by the hands to others. In any climate, but especially in the tropics, insect bites must not be allowed to become infected. Scratching can easily cause this. For a doctor or nurse with infected sores or wounds anywhere, but especially on the hands, it would be reprehensible to operate or to examine or dress wounds. But on the other hand, in the interests of their own safety and the protection of their patients, doctors and nurses need to take more than the usual care of their personal hygiene. Any cut or other injury, any minor skin irritation should be properly treated and guarded against infection. This becomes even more of a duty in hot and humid countries where skin infections so easily arise.

Hygiene or health of the feet also deserves some notice. There is the same need as with other areas of skin for regular cleansing. The

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feet, as a consequence of the so-called civilized custom of wearing shoes or stockings, are much more difficult to keep free of 'dirt' and perspiration. Thus, skin irritations and infections arise more easily. A further unhappy penalty the feet have to pay for a slavish observance of the foibles of fashion is the stress and strain imposed by modern footwear. Toes and feet are cramped, walking is not fully natural, and with high heels and pointed shoes, the bones and joints of the feet, ankle and even legs are subject to distortion. Apart from consequent malformations, general fatigue is induced especially in such people as doctors and nurses whose duties demand much standing and walking.

It is perhaps a waste of words to declare that the most healthy state for the feet is when they are bare of all encumbrance of cover, for this advice cannot be followed by most. The sandal without socks or stockings, in allowing normal position and free movement of toes, ankle and leg, is then the most suitable footwear. Again it is unlikely to be generally used. The advocate of good foot care can but recommend as wise the wearing of flat-heeled, broad-toed footwear for both sexes. Socks or stockings should not be tight fitting, but porous or cellular and frequently changed.

It is again in tropical conditions where infections are so easily contracted that more frequent washing and drying of feet and changing of socks must be done. Dusting with mild skin powders is helpful for the feet as for other parts in such circumstances.

The **mouth and teeth** suffer neglect even in people who otherwise keep themselves clean. Yet this too easily leads to mouth infections and premature decay and loss of teeth. Simple measures again are usually sufficient. Eating an apple at the end of a meal helps to clean the mouth. Rinsing of the mouth and gargling with plain water frequently and at least after meals is a necessary practice. Then brushing of the teeth with a moderately firm brush completes the necessary care. It goes without saying that regular dental inspection, at least every six months is a wise precaution in preserving good teeth.

In this age of soft, frequently unbalanced and excessive carbohydrate and sugar diets it is more difficult to avoid dental decay than before. Food particles lodged in gaps between or in cavities in

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teeth set up chemical destruction of enamel and adjacent tissues. Hence the reason for regular cleansing of mouth and teeth.

As in other personal hygiene practices there is no need to seek special mouth or dental toilet preparations. Simple lotions and creams for the skin and simple mouth-washes are as fully effective and considerably cheaper than the glossy, highly advertised and expensive proprietary products.

Social custom in most advanced communities has largely eliminated spitting, or the clearance of nasal mucus without the use of handkerchiefs. Nevertheless, in many lands these habits, now obnoxious to others, persist. They are not only unpleasant but a danger in spreading respiratory infections such as tuberculosis. Health officers and nurses therefore serving in such countries face a difficult problem of health education. Instruction of all is needed but particularly of mothers and young children. This raises the question of daily handkerchiefs. Small an item though they may be for many, they are beyond the means of millions. Old pieces of cloth burnt after use are an unavoidable substitute. Even in civilized communities the cotton or linen handkerchief regularly returned to the laundry is being replaced on sound grounds by the box of paper tissues. These pieces are destroyed and so cannot convey infection. Such actions as coughing or sneezing need control. The consequent spray of droplets dispenses respiratory organisms, many potentially infectious, in a room, hall, train, or bus. Again the covering of the mouth and nose with a handkerchief or tissue is an obvious duty towards one's fellow-beings.

POSTURE, GAIT, EXERCISE, GAMES

It is rare to find mention of these subjects in books of hygiene for nurses and health officers. Yet they are subjects where personal knowledge and practice are as equally important as in the more obvious matters concerning the skin, feet, mouth and teeth. Neglect to watch the growth of the body, and habits of sitting, walking, or running may mean the continuation of bad practices to the extent of permanent bodily damage. Such damage can take many forms—joint and body changes—malformations of limbs or

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spine—muscular weaknesses—and the general effects of fatigue and body inefficiencies.

Regular observance by the mother and teacher of the growing child can help to start proper practices and conversely to correct unsuitable stance, sitting, or walking—or ensure the treatment of such things as flat feet or twisted spine in time. Later chapters will refer to some of the diseases and injuries such as poliomyelitis, tuberculosis and congenital conditions which cause gross crippling.

Assuming the child has been normal at birth and has been protected from crippling disease, the development of correct posture and gait is dependent upon several factors. His food must be adequate and balanced. This ensures growth and vigour and protects against deficiency diseases. Today the better feeding of most people of developed countries has reduced to insignificance the occurrence of such conditions as rickets caused by the lack of vitamin D, especially in sunless countries. But it is to be remembered that many people in less fortunate lands are still not properly nourished, and hence their growth can be badly affected.

Then naturally every encouragement to exercise by the normal play and games of children, if possible out-of-doors, is important. Thus the structure of bones, joints and muscles is helped to full growth, and their functions—walking, running and jumping are similarly developed. If the structure is sound and movement is easy and free then usually proper posture and gait follow naturally. However, a child can have both its posture (sitting or standing) or its gait (walking or running) harmed through developing unconscious bad habits. Then too easily the rapidly growing child if kept too long sitting in cramped or badly designed chairs or desks can lapse into positions likely to curve or twist the spine and its joints with the pelvis. The watchful parent, nurse or teacher will advise or obtain more suitable furniture and guard against fatigue.

Similarly observation will soon notice the child who stands badly, or detect walking or running where feet have a tendency to flatness, or the shoulders to slouch. Exercise and drill if not overdone, help in producing both good posture and body movement. If at the same time a sense of pride is associated in these performances the bodily tone is further strengthened. In sitting, the choice of a

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chair of a proper height with its seat and back slightly concave and for work at a right angle is necessary. Then in walking keep head up, shoulders back, heel and toe in line and arms swinging in harmony. The psychological aspect of posture is frequently overlooked and it can do much to show the person's attitude to life and his state of mind.

Exercise today is more than merely a general need to keep fit. It is now known that exercise graduated to age is also a partial safeguard against some of the chronic degenerative diseases including heart and circulatory conditions. More than ever in our urbanized, sedentary world a conscious effort and even plan is needed by everyone to take exercise. To be acceptable and even most useful such exercise is best taken in a pleasurable form. Hence the great value for all of *games*, ranging from the violent forms for youth to walking, golf and bowls for older people. But to many, especially those in large cities, getting exercise through games is not always simple. Such people should include some open-air activity such as walking, which is one of the best forms of exercise, for their week-ends. Then in most industrialized countries provision exists for gymnasias or radio programmes of physical exercises. Important though exercise is, it is not wise to make such a fetish of it as to result in excessive tiredness.

Exercise is today more than ever an essential personal health practice. It helps the whole musculature, the circulatory and respiratory systems, the skin and the nervous systems to develop normally and fully. Taken regularly and sensibly throughout life it helps to maintain the whole body and its metabolism in optimum efficiency. Then too physical exercise has a direct influence on mental vigour and health. It reduces anxiety and tensions.

CLOTHING

Mankind must originally have taken to wearing skins or garments of bark and grasses as a protection from the severe cold of prehistoric winters. Clothing is today both a physical and social necessity for nearly all peoples. The growing unity of the world is also bringing a uniformity in the type of clothing. More and more

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the peoples of Asia and Africa follow those of Europe and America in the style of both feminine and masculine dress.) Nevertheless there are millions of peasants in Asia and Africa who wear traditional clothing. There are the blue cotton trousers and simple jackets of the Chinese, padded in winter, and the long gowns of the Arabs. Traditional garments though these are, they are effective in countering the effects of heat and sand in the desert regions of Asia Minor and North Africa and arctic cold in the Chinese winter.

(To the hygienist clothing is of importance. It has the main function of protecting the body against excessive and too rapid changes in temperature. As we have noted earlier, body heat loss and control are largely functions of the skin. If the skin surface is exposed too directly and continuously to cold, a point is reached where the body cannot maintain the temperature balance. Discomfort and even tissue damage, such as frostbite, may follow. In extreme cases the loss of heat results in bodily function itself failing and death follows. Though clothing in this protective sense is mostly thought of therefore in terms of cold it also is used to safeguard the body against the other extreme in certain cases. The direct rays of the sun in tropical and sub-tropical regions and in high mountainous places are able to damage the unprotected skin. This is mainly due to the ultra-violet content of these rays. Sunburn is avoided in such cases by suitable clothing.)

(Protective clothing is needed in many special occupations—steel and chemical works, and atomic plants. These are extreme cases of a more general use of clothing, namely the protection of the skin from injury. This is a valuable health function in everyday life. Of a similar character is the part played by clothing in preventing insect bites. Multiple bites can in themselves be harmful, especially if through scratching they become infected. But it is the spread of several infections by insects which is of most concern. The prevention of mosquito (malaria and dengue), tsetse fly (sleeping sickness) and sand-fly (sand-fly fever and leishmaniasis) bites is helped considerably by covering as much of the body as possible. Clothing which therefore includes the arms and legs as well as the trunk is a distinct barrier to insects. Hence long trousers

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and long-sleeved shirts or blouses are desirable for people whose occupation or travel exposes them to the risks of biting by disease vectors such as mosquitoes and tsetse flies.)

In view of these health considerations the type of clothing and its material come to be of concern to doctors and nurses. Clothing in certain climates has to conserve heat, but conversely in others it must allow of free air ventilation in avoiding heat and sun effects. In all cases clothing must not limit body movement, cause tightness, restrict the limbs (blood flow), create pressures (footwear), or irritate the skin. Further, the lighter the clothing the better, provided it fulfils its other functions. (Most clothing also needs to be porous and permeable both to allow freer circulation of air and evaporation of perspiration. This latter quality is especially desirable in inner garments, but clearly is a disadvantage in outer coverings worn in extremely cold external conditions. Thus seamen wear oilskins to keep out spray and cold winds. In countries with near arctic conditions of temperature and wind, in winter, outer garments have to be of wind- and waterproof materials to conserve body heat and to prevent cold air and moisture drawing it off.)

Modern materials offer many advantages over the clothing of even twenty-five years ago. New cottons, wools and plastic fabrics besides the attraction which their design, texture and colour convey, are durable, light in weight, and according to the purpose, light and airy, or light and warm. The way such new materials can keep even mountaineers on the top of Everest or arctic explorers warm is most remarkable. This is due to two chief qualities. Firstly, these garments are quite wind- and moisture-proof, and secondly they do not conduct heat. So body heat is retained even with outside temperatures away below zero and in blizzards of wind and snow.

Feet are notoriously difficult to keep warm, but modern footwear also benefits from these non-conductive materials. Feet become cold mostly because heat is drawn away from them through poor shoes and socks. But again footwear is now to be had lined with non-conducting and soft tissues, both natural and synthetic.

The common materials in use in the world today are cotton, wool and synthetic fibres for clothing, leather and rubber for foot-

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✧ wear. Cotton is by far the commonest. Millions in Asia, Africa and many parts of America know no other material. It is cheap, tough, and easily laundered. In tropical climates it is consequently the material of choice, additionally so in having smooth surfaces and forming thin conducting layers. It therefore does not retain heat nor moisture to the same degree as wool.

✧ Wool has been the traditional material for cold countries as it makes thick porous clothing which is consequently less prone to conduct body heat. Not having a smooth surface wool garments may be irritating, also become dirty more easily and are less easy to launder cheaply.

✧ Synthetic materials are today, if still relatively expensive, capable of being manufactured to give most of the advantages of natural fibres with even additional qualities. Then the combination of natural and synthetic fibres is producing materials which combine the best of both. The earlier lack of porosity on the one hand and the tendency to attract dirt largely by frictional magnetism on the other were disadvantages which have been eliminated from the newer synthetic and combined materials. They can now be obtained ranging from the completely impervious non-conducting material needed for complete protection from cold and wet, to open, porous, light tissues quite appropriate for hot, humid climates.✧

Footwear designed to allow natural growth and convenience for the feet has been described above. In the present context it is necessary to refer only to the fact that leather retains its supremacy in the manufacture of boots and shoes. Even so, large numbers of the poor of all continents cannot afford leather footwear. The rubber or even wooden sandal then has an appeal. Thus old motor tyres in many countries achieve a final service by making many pairs of sandals. In cold damp countries unprotected leather is not in itself able to keep feet warm. Moisture eventually soaks through and body heat is lost by conduction directly. Hence special layers of non-conductive impervious materials (now conveniently rubberized or plastic) are desirable.

✧ Silk and linen are not of general health importance in most countries in spite of their obvious good qualities, as their high costs are prohibitive for all but the few.

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Headwear and hats are worn by relatively few of the total world population. The erroneous belief in the direct lethal action of sun-rays on the head is no longer accepted, so that the old-fashioned pith-helmet and other elaborate tropical head-gear are largely things of the past. Hats are welcome, however, to many in extremely hot or bright sunlight giving some relief to heads, eyes and faces not fully acclimatized. A sunshade or parasol is better in such extremes in that it gives shade but allows full play to ventilation and air movement over and about the head.

Other outmoded articles of clothing are the spinal pad and red flannel abdominal belt. The first was thought to guard the nervous cord against direct lethal rays of the sun, and the latter to prevent cholera and dysentery. Neither has any such power, and in increasing the warmth and discomfort of the body were even harmful.

EATING, DRINKING AND SMOKING

In Chapter 5 nutritional needs and diseases are described. Here it is convenient to refer to the importance of teaching proper habits in **eating**. As in nearly all human activities, the time for establishing such ways is in the first three to five years.

Many millions of people do not always get sufficient regular food, so it is difficult to argue with them about the wisdom of regular mealtimes, over-eating, or a balance of protein, fat and carbohydrate. Hunger cannot await such considerations. However, in industrial countries and those copying the ways of the West there is a need for persuading people to eat wisely. Regularity in mealtimes is physiologically sound in that the alimentary tract and the autonomic nervous system take up a rhythm which produces the digestive juices and intestinal movement in optimum conditions. In such communities too the bad habit of over-eating is too easily formed leading not merely to overweight but contributing to arterial and kidney changes. These partly explain the unfortunate increase in circulatory diseases such as coronary thrombosis.

Feeding habits should be instilled in infancy in the sense of having meals at regular times. Breast feeding in the early months of life is the best start to this as it is also in ensuring most health advan-

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tages. Besides an early conditioning of the whole digestive system to regularity it is the surest safeguard against digestive, nutritional, and even infantile gastro-enteritic infections. Thus the feeding habits of infancy lead naturally on to those of childhood. In this phase, however, fussiness or anxiety in the mother may disturb healthy practice leading to the so-called fractious or 'faddy' child. The temptation is for the mother to surrender to the situation by giving food or tit-bits between regular mealtimes. This is to be resisted, so that the child is persuaded naturally to accept meals at stated times and to take them willingly and fully. Adequate but plain meals at this stage help too the formation of proper appetite and food tastes. Plain food with the inclusion of items of even some hardness, or coarseness such as toast, apples or other firm fruit, coarse grades of breakfast cereals makes for good mastication and bowel function. It too helps to avoid the development of a liking for soft, over-refined or 'rich' foods.

As middle-age arrives food habits need more conscious control in communities accustomed to good living. Resolution in resisting the temptation to make eating in itself too important will help to avoid not merely excessive weight but general metabolic sluggishness and even such killing conditions as coronary disease.

A further temptation which has to be resisted is that offered by persuasive advertisements. These offer to stimulate jaded appetites or to ensure slimness, in spite of hearty eating, by a person taking various pills, tablets or other preparation. Sound medical advice alone justifies resource to such practices. A life mentally and physically in harmony offers little call for artificial aids to assist eating.

Drinking of alcohol fortunately leads to marked chronic alcoholism in relatively few people in most communities. It is now accepted that such alcoholism is more than the result of the physical habit. There is usually also a psychological factor of a sense of insecurity or frustration. However, it is a fact that alcoholism is becoming a serious public health problem in many industrially advanced countries. This is not the type of excessive drinking associated with extreme misery, say in the slums of communities suffering the evils of bad industrialization. It is the alcoholism which develops through years of gradually increasing consump-

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tion. It is a most intractable condition. Hence there is much wisdom in everyone desiring alcohol to make a rule to take such drinks only before or with lunch or dinner and then only in true moderation. Especially to be resisted is taking alcohol in increasing amounts through life or at irregular hours, and most of all before any activity, such as vehicle driving, calling for quick judgement and clear decision. Even small quantities of alcohol are now known to impair physical and mental efficiency in these situations. There is no justification scientifically or otherwise for the belief with some that alcohol is essential in tropical countries. Indeed, there, it is especially insidious in the harm it does.

Apart from the unfortunate direct consequences of bad drinking habits there is the effect they have on the general health. Alcohol causes such ill-health as gastritis, hepatitis, metabolic disturbance and contributes to general circulatory and nervous system degenerations.

Smoking was formerly not believed to be a serious danger to health, though recognized to cause such minor symptoms as 'smoker's cough'. Today, smoking has been incriminated as a serious public health hazard and is even declared by many to be a true drug addiction. It is a factor in not only minor local irritations to the mouth and bronchi, but also in serious degenerative circulatory disease and especially lung cancer. Lung cancer in Western Europe and North America has grown to epidemic proportions, and smoking especially of cigarettes is believed to be chiefly responsible. There is a call therefore for personal decision. Not to smoke at all is the most desirable practice. The public need is to persuade young people, even school children, not to start. Apart from direct health educational campaigns, which are not usually very successful, the force of example is most effective. Nurses and doctors can thus give a useful lead in dealing with this important medical problem by themselves not smoking.

SLEEP, REST, RECREATION

The best period of learning most habits and attitudes is before five or six years of age. Thus a responsibility rests on mothers,

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nursery school teachers and nurses to develop proper habits in young children as early as possible. Thus regularity of the timetable for sleep, exercise, mealtimes and similar routine activities is a necessarily early habit to fix. It is the type of habit which combines both mental and physical adjustment. Regularity in such essentials does much to form a normal pattern of sleep and rest throughout life.

Sleep is still not entirely understood as a physiological process, but is essential for health and vigour. Though everyone must sleep there is much variation in the amount and type of sleep. The majority of adults sleep best at night with an average of eight hours. A small number are satisfied with five hours, while a recent famous example of a man with unusual sleeping habits has been Winston Churchill. During the Second World War he slept only four or five hours in the early hours of the morning with a short 'nap' during the day. At the other extreme are infants who spend most of their time asleep, and young children needing ten or twelve hours daily.

Sound sleep is helped by regularity in bedtime, mild fatigue following a day of normal physical and mental exertion, freedom from worry or anxiety, a comfortable but not too soft bed, and protection from excessive or sudden noise. Older people, though often satisfied with shorter hours of sleep during the night are helped by a short rest or even 'nap' in the afternoon.

A few people, usually those of a tense or introspective type, are unfortunate enough to suffer from sleeplessness or insomnia. This can be lessened if they take a fair amount of physical work or exercise regularly each day; avoid stimulants such as tea, coffee, or alcohol in the late afternoon and evening; remove as far as possible factors inducing mental excitement or anxiety, and take a warm milk drink. In the tropics sleeplessness due to the extreme discomfort of heat and humidity can seriously undermine vigour and health. Often there is little to be done, though every device to reduce heat and increase air movement is advisable. The use of cane matting under sheets and pillows is comforting.

Apart from sleeping as a restorative of mental and physical freshness human beings need periods of rest after periods of intense

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or monotonous activity or work. It is well known that modern industry has found rest periods, especially for those employed in repetitive or 'conveyor line' processes, beneficial to the workers and helpful in maintaining production. However, fatigue, especially for those doing mental work, does not always require rest in the sense of sitting or lying down doing nothing. Indeed much fatigue in modern industrialized society is a complex produced by routine occupations not always satisfying to the worker, and all too frequently by a lack of 'outside' interests. One of the important social problems is thus to help such people to overcome boredom, so-called fatigue, and many other symptoms of dissatisfaction and frustration. Hence the importance of *recreation*, hobbies and alternative occupation.

It is now fully recognized that one of the secrets of full health and a satisfying old age is useful occupation and widening interests. In the young this is partly given by outdoor pursuits such as scouting, guiding, camping, nature studies and by various games and sports. But the taking up of hobbies and other interests such as writing, painting, music, craftsmanship, social work and service, should be encouraged as soon as possible. Nurses and health officers, not only in the interest of their own happiness and health but in their duty to their communities, should take up such activities themselves and thereby encourage others to do so. Busy people are usually the happiest and least bothered by vague ill-health arising from frustration and boredom.

Chapter 4

Maternal, Child and School Health

Marriage is a partnership and when a child is to be born into a family it affects two people very closely, and not just one person. The future of the child will depend on many factors including the general health of the parents, their attitude to life and the family's economic position. If the relationship between the mother and father is a happy one there is every hope that the child will grow up in the security of a happy home where he not only receives affection, but is able to give it too. He will in all probability start out well-equipped to face the stresses and strains of the world and with the ability to live life to the full.

THE HEALTH OF THE MOTHER

Pregnancy was once called 'a nine months' disease with a spontaneous cure'. It is, of course, in no sense an illness, but the normal process of reproduction. For the mother, however, it is a period of stress and although there is no reason why she should not remain perfectly healthy during her pregnancy, her health needs careful supervision and a watch kept for any danger signals which might occur.

OBSTETRICAL CARE

Most mothers in Britain seek the advice of a midwife or doctor about the third month of pregnancy if not before. The mother should then have a thorough medical examination, both for her

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general and her obstetrical health. The doctor should make another obstetrical examination about the thirty-second week of pregnancy and at the thirty-sixth week, and sometimes weekly examinations are made during the last two months of pregnancy.

At the first examination the mother's blood should be examined to exclude the presence of venereal disease, and to find out if the mother is Rh negative. The haemoglobin content should be estimated and any anaemia treated and the mother's blood group ascertained in case she might later need a blood transfusion.

If the rhesus factor in the blood is positive in the father and negative in the mother, anti-rhesus antibodies may be formed in the blood of the person who is rhesus negative and the foetus may develop haemolytic disease. Careful supervision of the confinement and early life of the child is necessary. If antibodies develop the mother should have her baby in hospital so that any emergency can be dealt with.

If early in pregnancy the mother is found to have venereal disease, it is usually possible to cure her and to ensure that the child be born healthy.

Other diseases complicating pregnancy are heart disease, kidney disease, diabetes and tuberculosis. The mother with any of these diseases needs careful medical supervision throughout her pregnancy, and in the case of pulmonary tuberculosis it should be remembered that the pregnant mother usually feels well at this time, but tends to go rapidly down hill after the child is born, unless she receives expert care.

It is extremely important that the mother who is expecting a child comes for an early medical examination so that there is a good chance of putting right anything that may have gone wrong with her health, and of seeing that she is having an adequate diet. All expectant mothers should have a thorough dental examination and any necessary dental treatment be given.

The midwife usually examines the mother monthly up till the seventh month of pregnancy, then fortnightly, and during the ninth month, she makes weekly examinations. She takes the patient's blood pressure at every examination and tests her urine for the presence of albumin. A rise in blood pressure and albumin in the

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urine are danger signs and may herald eclampsia which is one of the preventible diseases of pregnancy. Eclampsia is a toxæmia and if allowed to develop, the patient has convulsions and finally becomes unconscious and may die. Every expectant mother should report at once any loss from the vagina, any swelling of the ankles, hands or arms. An unusual headache should be reported, painful micturition, nausea and vomiting and any blurred vision. These are all danger signs and the mother should never wait to report these signs until the midwife's next visit, or until her next appointment at the clinic.

The midwife should try and make her first visit to the patient at her home rather than at the antenatal clinic. She will take a careful history of the mother's illnesses and any other pregnancies, and she will see if the home conditions are suitable for the mother's confinement there. If the mother wishes or needs, for medical or social reasons, to go into hospital for her confinement, arrangements for this should be made as early as possible. Although there is a trend towards hospital confinements, many babies are born at home and the mother receives domiciliary care. She may book a midwife and a doctor for her confinement or just a midwife who may call in a doctor if necessary. If the mother will have no help in the home at the time of her confinement and afterwards, the services of a home help can often be arranged by the local authority.

THE ANTENATAL CLINIC AND HEALTH EDUCATION

Antenatal clinics are usually run by the local authority. Sometimes the general practitioner runs his own clinic for expectant mothers and some hospitals provide antenatal clinics. In nearly all cases it is here that the midwife has an opportunity to see her patients. Sometimes a physiotherapist attends the clinic to teach the mothers antenatal exercises. These help her to relax and prepare her for the act of childbirth. Mothercraft and general health measures can be learnt with advantage in a group at the antenatal clinic. The health visitor often gives this teaching and it provides her with a good opportunity of getting to know the mothers before their babies are born. Discussions on home management, budget-

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ing and food values can be popular and this sort of instruction often falls on more receptive ears before rather than after the birth of the children.

ANXIETIES AND EMOTIONAL DIFFICULTIES

During pregnancy, the mother is bound to feel anxious at times as to what the future may hold in store for her, and the husband is often found to be equally anxious at this time. The individual mother may not feel inclined to confide her special worries and fears during clinic time unless proper privacy is provided for individual interviews. Privacy can usually be found when the midwife visits the patient's home, which is one of the reasons why the home visit is so important, and the midwife can often allay a mother's anxiety when she is there. The father, too, often needs reassurance and understanding when his wife is pregnant. If all the interest centres on his wife he may well feel left out in the cold. It is important for him to feel that he shares part of his wife's experience and her hopes and fears. At some hospitals the husband is encouraged to be with his wife during her labour and be present at the birth of his child.

The unmarried mother will especially need the help of the midwife and the health visitor. There is not only the problem of bringing a child into the world without the support and protection of a father, but often the mother's relationships with her own family will have gone wrong, and the girl may be living in lonely isolation and need a lot of help in making plans for the future. The moral welfare worker is often called in to help the girl who usually looks upon her as a trusted friend.

POSTNATAL CARE

Every mother needs to be carefully looked after when she has given birth to a child. She has gone through a time of stress and in addition to obstetrical care she will need time to recover her full health again. One obstetrical examination should be made by a doctor at the end of the lying-in period and another six weeks

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after the birth of the child. This will ensure that her general health and her reproductive organs are in no way impaired or if there is any damage to them it can be put right. Some of the complications of childbirth may be cervicitis, subinvolution of the uterus or retroversion. Anaemia is not uncommon.

THE MOTHER AND EMPLOYMENT

Many women today continue their work in paid employment after marriage and during their pregnancy. Providing that the work is not too tiring for the mother, she may continue at work until the latter weeks of her pregnancy. In Britain a *maternity allowance* is payable to a woman insured in her own right each week for 18 weeks, beginning at the eleventh week before the expected week of confinement, provided that the claimant does not work as an employed person during the time she is receiving the allowance. It is an offence to employ a woman for the first four weeks after she has given birth to a child.

Ideally a woman needs several months of restful living to adjust herself physically and psychologically after child-bearing. Many women complain of tiredness at this time because they have had to return too quickly to their normal way of living with the added responsibility of a child to care for. It is above all after the child is born that the mother needs help in the home. If a mother has given up her employment after the birth of her first child, and her husband is out at work all day, she is often lonely and may miss the companionship she enjoyed when she was at work. She has a very real need for friends at this time, not least of whom may be the health visitor.

In most cases it is much happier for the child if the mother does not return to work for a number of years after the child is born. The child needs the loving care of his own mother and a mother substitute will rarely mean quite the same thing to him. The unmarried mother is often forced to seek employment very soon after the birth of her child and there are exceptional cases when the mother cannot remain at home and arrangements have to be made to look after the young child (see p. 56.)

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THE HEALTH OF THE YOUNG CHILD

The human baby is the most fragile of all the newborn in the animal world. He is badly equipped to fight the cold and it will be at least a year before he can make any attempt at running away from an enemy. His first few months are spent in feeding and sleeping and so perhaps it is understandable that he is extremely sensitive to the feeling of security and love his mother gives him.

First the midwife, and when she leaves the mother, the health visitor will instruct the mother in infant feeding. Every baby is an individual and every mother's circumstances are slightly different so that the health visitor will adapt her teaching to each particular family. Breast feeding is nearly always the ideal method of feeding in infancy and orange juice (Vitamin C) and cod liver oil (Vitamins A and D) are given in addition to the milk. The baby that was premature at birth will need extra iron.

PREMATURITY

If a child is born weighing $5\frac{1}{2}$ lb. or less he is considered to be premature, which means that his development is thought to be incomplete at birth. He needs special care as his respiration will be more difficult to establish and maintain. He will lose heat easily as his surface area is relatively large, and he lacks subcutaneous fat. He will not digest food easily and he will have small immunity to infection. Premature babies can be nursed at home if the birth-weight is fairly high and the parents are able to co-operate with the midwife. Infants with a birth-weight under $4\frac{1}{2}$ lb. are usually nursed in an incubator. Some hospitals have special premature baby units with specially warmed nurseries, where both temperature and humidity are regulated.

The cause of prematurity is not always known, but it is certainly more frequent when the mother has high blood pressure and toxæmia, in cases of placenta prævia, and when there are congenital malformations. It is also fairly common in multiple pregnancy when there are twins or triplets. There is a tendency to prema-

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turity in the first child a woman bears just as there is also this tendency at the other end of the reproductive scale with the older woman who is nearing the end of the child-bearing period. Another reason for prematurity is the advance of obstetrics which is reducing the number of still-births but tends to increase the number of premature births.

Good antenatal care does much to reduce the risk of prematurity and certainly good nutrition for the pregnant mother is important. Prematurity is found more often when there is poverty in the home than in a well-to-do one.

VARIATIONS FROM THE NORMAL

It is very important for both midwife and health visitor to observe whether there is any deviation from the normal in the child. The earlier that any deafness, blindness, congenital heart disease, mental defect or cretinism, club foot or congenital dislocation of the hip is discovered, the easier it will be to help the child and his family. If the child is a cretin and lacking in thyroid (hypothyroidism) he will become a dwarf unless he is given thyroid at an early age.

NOTIFICATION OF BIRTH

The midwife often looks after the mother and baby for the first four weeks of his life before the health visitor takes over the care of the mother and child. The health visitor is notified of all the births in her area through the medical officer of health. By law, the father of the child or any person in attendance on the mother must notify the medical officer of health of the birth of the child within 36 hours of the birth. By this means the health department knows of all new babies born in their area. Notification is quite apart from registration of the birth of the child which must be registered by the parents or, failing them, by anyone present at the birth, including the midwife, within 42 days of the birth.

The health visitor usually becomes the trusted friend of the family but her entry into the home is by right of courtesy only.

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When she pays a first visit to a new baby after the midwife has left, or the mother and baby have been discharged from hospital, she should try and call at a time that will be convenient to the mother. If the mother does not already know her, she must introduce herself and tell the mother that she will do everything she can to keep her and her baby healthy.

CHILD WELFARE CLINICS

In Britain each local authority provides child welfare clinics for the examination and supervision of the health of children up to five years of age. The clinics are usually open at certain specified times each week and the mothers can come here to seek the advice of the health visitor. A doctor usually attends at most sessions but only minor treatment is given at the clinic. If the child needs some major treatment, the mother is referred to her family doctor or the hospital.

The immunization of children against infectious diseases is carried out at the clinic and many mothers avail themselves of this protection which is offered against diphtheria, whooping cough, tetanus, poliomyelitis and other infectious diseases likely to attack children, see Appendix N, p. 227. Vaccination against smallpox is also available at child welfare clinics. Above all, the child welfare clinic is a place where the mothers can bring their ordinary everyday problems, such as feeding difficulties with their children, to the health visitor. She has a wide knowledge of infant feeding, experience of life and people and she has a great contribution to make towards a family's happiness. The child welfare clinic also provides an opportunity for social intercourse among young mothers and they can learn a great deal from each other.

Occasional crèches. Mothers lead busy lives and when their children are young it is often difficult for them to get away alone at all. Some local authorities run occasional crèches where a child may be left for a few hours in the morning or afternoon for a small charge, or free of charge if the mother has to attend a clinic or hospital either for herself or any of her family.

Day Nursery. Local health authorities provide day nurseries with

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trained staff for the care of children under five years old. The children spend the whole day at the nursery and have their meals there. As it is thought that most children thrive best in their own home and the cost of running these nurseries is extremely high, in most areas children are admitted only in certain circumstances. The child may be handicapped in some way and may need special care and the companionship of other children, or the mother may need some relief if she is spending all her time looking after a handicapped child and the nursery can relieve her of some of the strain. There may also be special home circumstances which prevent the mother looking after her own child at home. An example is the mother who is left a widow and has to go out to work to support her family. Private day nurseries have to be registered by the local health authority and supervised by them. Residential nurseries may be run by the local authority or a voluntary association. These nurseries are for children who for some reason or other cannot live at home nor be boarded out.

Nursery Schools are provided under the Education Act for children from two to five years. They may be open for part or all of the day. There is usually a bigger demand for vacancies than there are places.

Child minders: If any person looks after for the day more than two children coming from different households, for gain, her premises must be registered with the local health authority who may inspect them at any reasonable time. The local authority often uses suitable child minders to look after children who cannot fit into the pattern of a day nursery but would otherwise go there. The health visitor assesses the suitability of the child minder's home and usually certain conditions are laid down, one being that the child must attend the child welfare clinic.

ADOPTION

If anyone wishes to adopt a child in Britain there has to be an adoption order by a court of law and a number of conditions have to be fulfilled and investigations carried out as to the suitability of the person or couple who propose to adopt the child. In some cases

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the adopter is the parent of the child who was born out of wedlock. No adoption may be made without the consent of the parent or guardian of the child and consent may not be given before the child is six weeks old. The prospective adopter must have and look after the child for a trial period of at least three months before any adoption order can be made. Once the child is adopted he acquires the status and citizenship of his adopter who acquires the rights and duties of parenthood. During the probationary period, the child becomes a 'protected child' and he will be visited by the children's officer or one of her staff.

THE CHILDREN'S OFFICER

The children's officer looks after children deprived of a normal home life. Under the Children Act 1948, the Home Office became responsible for child protection instead of the Ministry of Health under whose jurisdiction it was formerly. Children's officers were appointed throughout the country and every area had also to have a children's committee. The children it looks after include those who have no parents or guardians or whose parents or guardians cannot make adequate provision for them or have abandoned them. It also includes children who are with a prospective adopter for the trial period before adoption, children placed privately for reward with foster parents, and children and young persons committed by a court to the care of the local authority because they are in need of care and protection, or because they have offended against the law. A great deal of legislation exists to prevent the child deprived of normal home life from being maltreated or exploited in any way.

THE HEALTH OF THE SCHOOL CHILD

As soon as a child reaches school age, he takes a more active part in keeping himself healthy. He steps into the wider world of school where he will no longer have the intimate supervision of his mother. His teacher who sees him every day will play an important

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part in his life and can instruct him in many of the principles of health, such as, for example, reading in a good light and having a good posture and not sitting about in wet clothes on a rainy day. He will improve his physique by learning to play outdoor games and he will also be taught gymnastics.

His body will be gradually trained throughout his years at school but it is also important for every child to understand the meaning of health just as he must acquire a knowledge of reading, writing and arithmetic. Each child should know how a healthy body functions and he should be aware of the common hazards to health and how they may be prevented and controlled. The prevention of diphtheria by immunization and the avoidance of road accidents by developing a good road sense are but two examples. Caution is never instilled easily into the young but the school pays a heavy price if it waits for one or two fatalities before it instructs the pupils in the prevention of accidents.

The boy or girl at school should understand the relationship of sanitation and school hygiene to healthy living and he or she should be able to carry out the precepts which have been taught. For instance, the would-be health educator should remember that if she teaches that every child should wash his hands after going to the lavatory and proper facilities are not provided at school, her teaching will be meaningless to the child.

Every child should learn the value of work and play, activity and relaxation, good food, fresh air and sleep. Above all he should learn that he is personally responsible for his own health and for meeting his own individual health needs. He may need more sleep than any of his friends if he wants to be alert and wide-awake during the day and the amount of sleep other boys take is no criterion as to his own requirement. He must learn what are his body's basic needs for health and how he can protect the health of others as far as possible. Infectious diseases travel rapidly from one child to another at school and every child should be taught that it is selfish to come to school when he does not feel well and may be developing one of the communicable diseases. It sounds simple, of course, to tell the child to stay at home if he feels out of sorts but this may have its complications for the mother if she

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normally goes out to work. It is one of the reasons why the mother tends to send the child to school if she possibly can and why infection spreads so rapidly at school.

School children learn about health from their school teachers whom they see every day. Children are very imitative and they will copy their pattern of living both from their teachers and fellow children. The influence of the school nurse and school medical officer will be greatest if both co-operate with the teachers and understand the general running of the school and its methods of teaching.

DUTIES OF THE SCHOOL NURSE

The school nurse is usually a trained health visitor and if she is the health visitor and school nurse for the particular area in which the school finds itself, she will know many of the children she meets at school. Her duties include health education and a number of school nurses run courses on mothercraft for the older girls. The school nurse is the link between the school and the home. She often gives advice to parents about their children's health and she gives any necessary information to the doctor about home conditions. All parents are invited to attend the medical examination of their child but many of them unfortunately do not avail themselves of this opportunity to discuss their child's health with the doctor. The school nurse will pass on to the parents any information about the medical inspection of their child which they should have.

A child at school has at least three routine medical examinations, one during his first year at school, one when he is about half-way through his school career and another before he leaves school. Children with special defects are seen more often by the doctor who will also see children brought forward by the request of parents, teachers or the school nurse.

In some schools it is the custom for the school nurse to make a preliminary examination of the children a few days before the doctor's visit. Records of the child's height and weight may be made by her or taken from the reports of the physical training instructors. The child's sight is tested and his hearing, and he or

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she is examined for cleanliness. If there are several school nurses available, the school nurse's preliminary examination of the child together with that made by the doctor can both be made on the same day and this saves disturbing the routine of the school on two different days.

Medical examination of all school children in State schools is compulsory but treatment may only be given with the parents' consent. The school nurse usually makes arrangements for any necessary treatment and there may be a school treatment centre which she attends. If this is open daily it greatly saves the time of school children who might otherwise have to journey to hospital and waste much more school time than they do in attending their own school clinic for minor ailments. If the school has an epidemic, the school nurse helps in the investigations made for its control and she also assists at any other special investigations made by the school medical officer.

Every good school nurse understands and likes children. She must be interested in positive health, have a great deal of tact in dealing with a variety of people and be interested in social conditions. Above all she needs a sense of humour. One rather skinny eleven-year-old boy was found by the school nurse pouring his free milk, provided by the school authorities, down the drain. On being asked why he did it, he said, "Oh, I want to be a jockey so I must be careful to keep my weight down or I'll never be accepted!"

One-third of a pint of milk is provided free of charge to all children of school age. School dinners are also provided for a small charge which must not exceed the cost of the meal and every State school has to appoint an organizer of school meals with adequate experience of catering on a large scale. The meal must give each child, according to age, 650–1,000 Calories and contain 20 grams of protein and 25–30 grams of fat. Well organized school meals which not only provide good balanced meals but are also attractively served can teach the children a lot about nutrition at an age when they are very impressionable.

The school dentist. Dental inspection and dental treatment is given to school children free of charge. A dental inspection is made as soon as possible after the child has begun his school career. In

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some school dental clinics, dental hygienists and dental auxiliaries assist the dentist. Orthodontic treatment is given when necessary. In some areas sodium fluoride is added to drinking water to prevent dental caries (see pp. 69 and 148).

HANDICAPPED CHILDREN

Every local authority has to provide education according to the age, ability and aptitude of the child. Some children cannot profit by attending an ordinary school. They may be blind, deaf, mentally handicapped, maladjusted, have a speech defect, or suffer from some physical handicap which makes ordinary school life impossible for them. Special schools are provided where handicapped children can learn to come to terms with their disability. Wherever possible, special classes are set up in a normal school so that the handicapped child can have some contact with normal children as well as those handicapped like himself.

The enormous improvement in the health of the school child is a reflection of the value of all the preventive services. Defects are discovered early when it is usually possible to correct them or to prevent the conditions from deteriorating. For instance, the very shortsighted child can often be educated in an ordinary school provided he is always allowed to work in a good light and is placed near enough to see the blackboard in class. With good co-operation from the teaching staff and the parents at home, he should not become so shortsighted that he has to attend a special school.

Both teachers and parents are much more health conscious today than they were thirty years ago and in some respects the work of the school medical officer and the school nurse is easier. Most schools are well-kept and clean and sanitary arrangements are good but other problems confront the health workers in school today. The average child now matures sexually earlier than before the Second World War and although physically mature, he or she is still in many ways a child and emotionally very immature. The feeling of insecurity and wanting to be considered grown-up brings

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with its temptations which many children are unable to cope with. Smoking is a habit commonly found among school children and alcoholism presents yet another problem. Juvenile delinquency is increasing all over Europe and there is a rise in the incidence of venereal disease. The school nurse today will find that the majority of her school children are clean and well-fed for the school provides free meals in cases of need. The children have, however, many emotional and psychological difficulties and are crying out for help in a very different way from their parents when they in turn were young. Above all, school children today need the friendship of adults and greatly respond to anyone who takes a sympathetic interest in their lives.

Chapter 5

Diet, Food and Nutritional Conditions

Good feeding is one of the best insurances against ill health. A family that is well fed is more than likely to remain healthy even though the living conditions are poor. When families living in slum conditions have been rehoused but have had to pay too high a rent for their income, more sickness and illness has occurred than when they lived in the slums and could afford an adequate supply of food. It would thus appear that good food and enough of it is even more important than the right sort of housing. Malnutrition has also occurred among old people who have been moved out to new housing estates where the shops were a long way from their new homes. Shopping for food became a veritable expedition which they often felt too tired to undertake, and they sadly missed the availability of food at some shop round the corner from their old home, or just across the road.

In looking at any diet to see if it is adequate two important questions to ask are whether it contains enough Calories and enough protective foods and proteins. Unfortunately whenever there is not enough money to spend on food, bulk is considered rather than quality, and the protective foods and proteins are usually found to be sadly lacking. Calories and protective foods are both essential but all too often as Calories quickly allay the pangs of hunger the need for protective foods is neglected. Malnutrition, in the shape of various diseases, results.

A Calorie is a unit whereby heat is measured. In nutrition it is the amount of heat needed to raise the temperature of 1000 grams of water 1 degree Centigrade. A gram of carbohydrate and a

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gram of protein both produce 4 Calories, but the same weight of fat produces 9 Calories.

The amount of Calories required by the body depends upon a person's activity. If he is at rest in bed he will need far fewer than if he is doing strenuous physical work. The basic energy required to maintain life in a person when he is at rest is called his basal metabolic rate. In planning any diet it is important to remember that the amount of food eaten, the amount of energy expended and the body-weight are all related.

In spite of the variety of foodstuffs found in different parts of the world and the very different foods that people eat, there are, nevertheless, certain basic requirements which every human being must have if his body is to be properly nourished. He must be able to build up the body tissues and repair broken-down ones and produce energy. He does this mainly by eating food derived from other living things in the animal and vegetable kingdoms.

Firstly he must have oxygen and water, which can be termed 'foods', for the body is quite dependent on them. Oxygen is found in the air we breathe and respiration depends on a good supply of it; so does combustion of the organic materials taken in as food. Oxygen converts the latent energy of food into energy for the work of the body. As a result of muscular exertion, lactic acid is formed in the muscles. This is turned by the oxygen in the blood into carbon dioxide and eventually breathed out through the lungs.

WATER

Water forms about two-thirds of the body's substance and the percentage of water is highest in tissues such as the brain, glands and muscle, and especially the blood. Adequate intake of water is essential to life. It dissolves substances found in protoplasm, carries nourishment to the cells and is the medium in which chemical changes take place in them. It also carries away the end-products of chemical changes and its evaporation from the lungs and skin regulates body temperature. Water is necessary to make the digestive tract function efficiently and if enough water is not drunk,

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food cannot be absorbed properly. In addition to the $1\frac{1}{2}$ pint (757·667 ml.) of water absorbed each day from the 'solid' food eaten and another half pint (284·125 ml.) produced by the oxidation of foods in katabolism, a person needs to drink more than two pints (1137 ml.) of water or liquid a day to make up for the water lost by the kidneys, skin, lungs and bowel. In urine about $2\frac{1}{2}$ pints (1421·125 ml.) is excreted daily, about one pint (568·5 ml.) from the skin, dependent on the temperature, $\frac{3}{8}$ pint (213·187 ml.) from the lungs and $\frac{1}{8}$ pint (94·75 ml.) from the faeces. If the intake of water is not sufficient there may be lack of appetite and headache and disturbance of the digestive tract. The great importance of water can be seen in the sick child who is being deprived of fluid, by diarrhoea and vomiting. He rapidly loses weight, the skin becomes dry and he is exhausted and will die unless the loss of body fluid is replaced. Whenever the body is in short supply of water, the chemical changes in the tissues, involving substances in solution, will all be affected.

NUTRIENTS

All the various foods fall into groups of nutrient substances. They are proteins, fats, carbohydrates, minerals and vitamins. In protein are to be found ten essential amino-acids. These are: isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine, arginine and histidine. The last two are necessary for the growing child. From fat is derived linoleic acid and from carbohydrate, glucose. The eleven inorganic elements of which man requires small quantities are: sodium, potassium, calcium, magnesium, phosphorus, iron, copper, sulphur, manganese, chlorine and iodine. The main vitamins required are: A, B group, C, D, E and K. To enable the body to make use of these nutrients, the food eaten must also have a certain bulk, for the roughage or indigestible material stimulates peristalsis, the rhythmic movement of the intestines.

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PROTEINS

Proteins differ chemically from fats and carbohydrates in that they contain nitrogen, as well as the carbon, hydrogen and oxygen which the other two nutrients contain.

All living cells are composed of proteins, therefore protein is needed for growth and repair of the cells. The protein itself is composed of amino-acids of which ten listed on p. 65 are essential to life. Animal proteins nearly always contain all these amino-acids and are therefore called complete or first-class proteins. Vegetable proteins often lack one or more of the essential amino-acids and are called incomplete proteins. A good diet contains both complete and incomplete proteins, but 5 per cent of the total Calories should come from complete or first-class protein.

Amino-acids cannot be stored in the body, and if they are not used to form body protein, they are converted into carbohydrate and fat. When supplies of good quality protein from meat, fish, milk, cheese and eggs are in short supply, it is better to give a little at each meal rather than to give all the good quality protein at one meal of the day. The complete proteins can combine with the incomplete proteins such as are found in most cereals, nuts, peas, beans and lentils, and the body can then make fullest use of these amino-acids.

Everyone needs proteins for repair of the body tissues, but the growing child and the pregnant or lactating woman all need additional supplies for growth or milk production. Of their total Calories, 14 per cent of them should come from protein. In the last half of her pregnancy the expectant mother should have 1.5 G protein for every Kg. of her body-weight. Lack of protein results in stunted growth, lack of energy, digestive disturbances and lowered resistance to infection. An adult in a sedentary occupation should have a diet in which the protein represents at least 11 per cent of the total Calories. The normal requirement is 1 G. protein for every Kg. body-weight. In normal life any spare protein that is not needed for growth or body repair is used as a source of heat and energy.

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FATS

Fats which are compounds of glycerol with fatty acids consist of carbon, hydrogen and oxygen, but in different proportion to those found in carbohydrates which are the starchy and sugary foods. Some of the fatty acids are called *saturated* which means that they cannot take up any more hydrogen. They include butyric acid, palmitic and stearic acid, and caprylic acid. The *unsaturated* fatty acids can be changed to saturated fatty acids by the addition of hydrogen if certain laboratory conditions are present. This occurs in the manufacture of margarine when the liquid oil is hardened. The unsaturated fatty acids include oleic acid, linoleic acid, arachidonic acid. Some of the fatty acids cannot be synthesized by the body and are called essential fatty acids. An example is linoleic acid.

In the body, the mechanical functions of fat are to lubricate the digestive tract, keep the body warm, as fats are bad conductors of heat, and give protection to organs by forming a fatty covering around them which protects against shock. Fats depress gastric secretion so that the stomach empties more slowly than it would do otherwise. Vitamins A, D, E and K are fat soluble, and are therefore carried by fats.

The sources of fat in the food are chiefly butter, lard, meat fat and oils. One gram of fat can provide 9 Calories, whereas the same weight of protein only yields 4 Calories. Fat is therefore a concentrated means of supplying energy.

CARBOHYDRATES

Carbohydrates which are compounds of carbon, hydrogen and oxygen come directly from vegetable foods. They may be eaten either as fruit or vegetable, or in a prepared form such as sugar. The starch content of foodstuffs varies with the water content. Root vegetables, for instance, have a large water content, whereas cereals contain a much larger content of carbohydrate for the same weight.

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Sugars such as glucose, fructose and galactose are *monosaccharides* or simple sugars. When two monosaccharides join together they are called *disaccharides*. Sucrose or cane or beet sugar is a combination of glucose and fructose; lactose which is found in human and animal milk is a combination of glucose and galactose. Maltose is formed of two glucose molecules. The germinating grain forms it from starch.

Polysaccharides are compounds made up of monosaccharide molecules. Starch for instance is made up of glucose molecules. In an ordinary diet, starch is the main energy-giving food and sufficient carbohydrate must be taken to make up the total Calories needed by the individual. One gram of carbohydrate yields 4 Calories.

MINERAL ELEMENTS

The cells and fluids of the body need certain mineral elements either for their structure or to carry out their functions of the body.

Calcium. The body contains 1,050 grams of calcium for it forms an essential part of the bones and teeth and is especially necessary during growth. It is also a catalyst and necessary for muscle contraction and the conduction of nerve impulses, and for the clotting of blood. As the body excretes about 300 mg. of calcium daily, at least 600 mg. should be the daily intake. The best sources are milk and cheese. As a shortage of calcium was not infrequently found in the diet in England, bread and flour are usually fortified with calcium.

Phosphorus. Phosphorus is also important in forming bones and teeth and it is also a catalyst. It is found in dairy foods, fish and meats and although twice the amount by weight of that of calcium is needed by the body, there is scarcely ever a shortage of phosphorus in the diet in Britain.

Iodine. The thyroid gland contains iodine and, if this is lacking in the diet, goitre may result and children may be born cretins. The best sources of iodine are sea foods. In countries where the soil and water are lacking in iodine, salt is iodized to prevent a deficiency of iodine in the diet.

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Iron. Iron is essential for haemoglobin of the blood and for the carrying of oxygen to the tissues. The daily intake should be about 12 mg. Iron must also be present in the diet as the body loses it when any bleeding occurs. Small amounts are lost in the faeces and in the general wear and tear of the body. Meat, especially liver, green vegetables and eggs are good sources of iron and as a shortage of iron is frequently found in the diet in Britain, bread and flour are fortified with it. Expectant mothers usually need an additional supply of iron over and above that found in their diet.

Sodium and potassium. Sodium and potassium are essential to the body. People usually eat more than enough salt to cover their daily body requirement, which is about 4 G. The body loses salt in the urine and through sweating. In very high temperatures when sweating is excessive extra salt may be needed by the body.

Potassium chloride is found in muscles and the red corpuscles of the blood. It is excreted in the urine but not in the sweat. There is usually an adequate supply of potassium in all normal diets as nearly all foodstuffs contain potassium.

Fluorine is a halogen element and is found in bones and teeth. It dissolves in water producing an oxidizing agent. In the Birmingham area it has been added to drinking water in minute quantities (about one part per million) in the hopes of preventing dental caries, see also p. 148.

VITAMINS

The body cannot remain healthy without vitamins. They are substances essential to life which must be found in the food in addition to the right quantities of protein, fat, carbohydrate and mineral elements.

VITAMIN A is found in certain fats, especially fish liver oils. It is also found in variable amounts in milk, butter, cheese and eggs. Animals derive their vitamin A from the food they eat, and green grass in the summer provides the greatest concentration of carotene from which the animals form vitamin A. Carotene is found in green and some root vegetables, particularly carrots. Man is able to

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change some of this carotene into vitamin A but not all of it, so that the best source in our diet comes from the animal foods actually containing the chemical vitamin A.

Vitamin A is essential for growth, night vision and keeping the surface tissues and mucous membranes healthy; lack of vitamin A causes poor growth, lesions of the eye and cornea, night blindness and follicular keratosis, which is a lesion of the skin.

VITAMINS OF THE B GROUP. All the vitamins of the B group are soluble in water but the vitamins in this group are not all found in the same foods. Important members of the group are thiamine, riboflavin, niacin, pyridoxine, cyanocobalamin, folic acid, pantothenic acid and biotin.

Thiamine is also called aneurine or vitamin B₁. Some of this vitamin is destroyed by heat and also by alkalis. The body requires 0·06 mg. thiamine daily for every 100 Calories provided by carbohydrate or protein. The function of this vitamin is to act as an enzyme-component in the production of energy. Lack of this vitamin causes poor growth, apathy and tiredness, and, in extreme cases, beri-beri, when the patient has multiple neuritis, dropsy and cardiovascular disturbances. Foods rich in thiamine are cod roe, wheat germ, Brazil nuts. It is also found in pork, ham, liver, butter beans and lentils.

Another member of the B group of vitamins is *riboflavin* or vitamin B₂. Riboflavin helps in the release of energy from carbohydrate foods. Lack of it causes poor growth, soreness of the tongue and lips, mistiness of the corneal cover of the eye. Good sources of riboflavin in the food are found in liver and kidney: some riboflavin is also found in beef, cheese, herring roe, eggs, chocolate, mutton and milk. Strong sunlight destroys riboflavin, therefore milk should not be left in the sun (see p. 74).

Niacin is a vitamin formed by nicotinic acid which is converted to its active form, nicotinamide, in the body. Niacin is an important factor whereby the body obtains energy from food. Lack of it causes poor growth, rough and red skin, especially on the hands, face and neck, digestive upsets and, in extreme cases, the disease, pellagra. In this disease there is loss of weight, weakness and the skin, alimentary and nervous systems are affected. Niacin is

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found in liver: some is found in beef, pork, wholemeal bread and fish.

If the diet contains a good amount of animal protein, even though there is a very small amount of niacin taken, there will be no signs of niacin deficiency. This is because tryptophan, an amine-acid, found in most animal proteins, can be converted into niacin in the body.

Pyridoxine or vitamin B₆ is a vitamin essential for growth; it helps to break down tryptophan into niacin and is also a factor in the chemical mechanism of other amino-acids. It is concerned in keeping the nervous system healthy and with red blood cell formation and fat metabolism. Good sources of this vitamin are yeast, liver, cereals and pulses.

Cyanocobalamin or vitamin B₁₂ is a complex chemical discovered in 1948. It is unlike the other vitamins in that it contains a metal, cobalt. This vitamin is concerned with growth and it possesses the anti-pernicious anaemia factor, and prevents the degeneration of nerve cells, particularly those of the spinal cord. Its chief source is liver, but it is also found in kidney, meat and other animal foods.

Folic acid is a vitamin which helps in the formation of nucleoproteins and is important in the forming of new blood cells. The vitamin is therefore used in curing some forms of macrocytic anaemia. It cannot be used for pernicious anaemia. It is found in liver and green vegetables.

Pantothenic acid is another vitamin concerned with growth and a healthy skin. It helps in the metabolism of carbohydrate. It is found in liver, meat, eggs, yeast, cereals and milk.

Biotin is a vitamin which helps to keep the skin healthy. It is found in liver, egg yolk and yeast. Raw egg-white contains a substance which counteracts the function of biotin, so that if eaten in large quantities it is harmful to the body. Cooked egg-white has no such action on biotin.

VITAMIN C or ascorbic acid is soluble in water and is found in fresh fruit and vegetables, but it can be very easily destroyed by cooking and exposure to light. To retain as much vitamin C as possible, green vegetables should be cooked rapidly and in as small an amount of water as possible. The body requires up to 30 mg.

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daily of vitamin C which is essential for growth and repair of the tissues, especially after injury. Lack of vitamin C causes scurvy, which is characterized by swelling of the gums, and haemorrhages into the skin and from the mucous membranes. Blackcurrants are a very good source of vitamin C, and oranges, lemons and grapefruit also contain a good deal. New potatoes are quite a good source of the vitamin, but old potatoes contain very little. As fruit and vegetables are expensive, vitamin C is sometimes in short supply in the diet, especially that of old people. Patients on a gastric diet require vitamin C, but their fruit and vegetables must be sieved to eliminate the roughage contained in them.

VITAMIN D. Without this vitamin calcium and phosphorus cannot be laid down in the bones. It is therefore a vitamin specially important to the growing child, and to the expectant mother. The child deprived of vitamin D develops rickets, and the adult, osteomalacia. In rickets there is general lack of tone, retarded development and eventual softening of the bones. The condition was often seen in Britain in the last century, but is seldom seen today as mothers are advised to add cod liver oil to their child's diet as a preventive measure. Fish liver oils, oily fish, eggs, butter and cheese all supply vitamin D, and the body also can form vitamin D by the action of sunlight on the skin. In the summer, dairy products contain a greater quantity of vitamin D than in winter.

VITAMIN E. This is an anti-oxidant, which means that it protects natural fats from being destroyed by oxygen. This vitamin is thought to play a part in keeping the cells of the body healthy. It is found in milk and wheat-germ.

VITAMIN K. This vitamin is fat soluble, and can be synthesized as menaphthone. It is necessary for the clotting of blood after injury, as it helps to form prothrombin. The vitamin is found in green vegetables, tomatoes, egg-yolk and liver, but most of the body's needs are synthesized in the gut by micro-organisms.

MILK

This is almost a perfect food. It contains protein, carbohydrate and fat, the inorganic salts and vitamins. Each species that secretes

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milk for its young gives it a food that is perfectly balanced to promote and maintain growth until the young creature can assimilate other foods besides its mother's milk. Milk is rather low in its iron and vitamin C content so that it is only in early childhood that it can be considered a complete food.

When human milk is not available to feed a baby, cow's milk can be given to it if it is free from contamination and has been suitably modified. Cow's milk contains about twice the amount of protein that is present in human milk; the same proportion of fat is found in both milks and cow's milk contains about one-third less carbohydrate than that found in human milk.

Milk is an excellent food for older children and also adults. In Britain all school children are given one-third of a pint of milk a day and it is a food found in almost every household.

Bacteria can multiply very rapidly in milk once they have gained entrance there. It is, therefore, of great importance that anyone who handles milk does not infect it in any way. A person who has a disease likely to infect milk is not allowed to work in a dairy. As tuberculosis is a disease which may spread from cows to humans by way of milk, all dairy herds in Britain must now hold Tuberculin Test licenses certifying that they are free of tuberculosis. Milk that is sold to the public is given heat treatment to destroy any harmful bacteria which might be present. It may be pasteurized or sterilized. Sterilized milk is filtered, clarified and homogenized so that the fat content is spread evenly throughout it. It is then boiled for a sufficient period to allow it to comply with the turbidity test laid down by Regulations. Pasteurized milk has either (a) been heated to a temperature between 145°F and 150°F for half an hour and then rapidly cooled to a temperature of not more than 30°F; or (b) been heated to a temperature of not less than 161°F for at least 15 seconds and rapidly cooled to a temperature of not more than 50°F.

The journey milk takes from the cow to the consumer in a large town is only about 48 hours. Milk is collected in churns from the various farms in a locality. It is then taken to a local depot where the milk is tested and any that is not up to standard is rejected. The milk is kept cool and transported to a central depot where the

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requisite heat treatment is given to it. Finally the milk is bottled and sealed and then delivered to the thousands of households who are given a daily supply of safe milk. The milkman's round is familiar to nearly all inhabitants of Britain.

People who are out at work all day should remember that milk left in the sun outside the house will lose some of its vitamin content. A receptacle for it should be made so that the milkman can leave the bottle of milk in it. This will also protect it from birds who sometimes delight in pecking through the tin-foil seals. Once the milk has been unbottled it should be put into a clean jug and kept covered with some suitable *porous* covering so that dirt and flies do not contaminate it.

Dried milk. As with other foodstuffs, milk can be dried and reconstituted by adding water to it. When the roller method is used to dry the milk it is poured over heated rollers. It can also be dried by a process of spraying it into hot air. Dried milk is often used when a baby has to be artificially fed. In a poor home, there is less risk of contamination than when cow's milk is modified and used to feed the baby.

CATERING FOR LARGE NUMBERS

Planning meals for a large group of people entails a great deal of thought and skill. The food has to be bought in bulk and the ordering has to be done carefully so that the price does not exceed the overall amount which has been allotted for feeding. The price of feeding per head does not necessarily become cheaper when large numbers eat together, for if the numbers become very large, more kitchen and waitress staff will be needed.

Menus are usually planned ahead so that the cooks know in advance what they will have to prepare. If a weekly menu is adhered to, this becomes monotonous for the people who eat the meals, as they get to know what to expect for a certain day of the week. If meals are planned ahead on a fortnightly or three-weekly basis, this avoids monotony for the people who eat the food. A choice of dishes is essential if meals are to be made interesting.

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School meals should provide a good proportion of each individual child's daily needs. It is usual to aim at providing 650–1000 Calories per meal, according to the age of the child, with 20 grams of animal protein and 25–30 grams of fat (see p. 60).

KITCHEN HYGIENE

The basic laws of cleanliness often have to be taught to kitchen staff, see Fig. 1. Anyone handling food must be clean in person and wash his hands before touching any food, and always after going to the lavatory. He must learn that the skin always harbours germs, and that the less food is handled the better. If any food has become infected epidemics such as dysentery spread rapidly where there is communal feeding. Food poisoning when investigated is often shown to originate in faulty kitchen hygiene.

The personal hygiene of the staff may have been good, but perhaps the kitchen mincer may not have been properly washed, or flies may have been allowed to settle on food because it has been left uncovered. All food, whether cooked or uncooked, should always be covered or it will quickly become a source of infection.

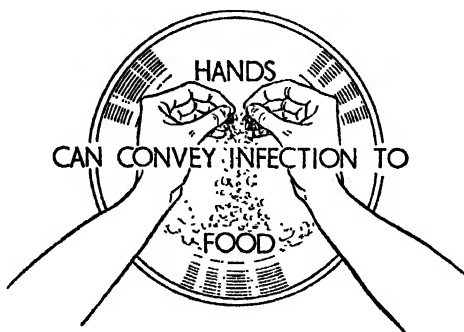


FIG. 1

It is also important to cool completely any food that is not to be eaten at once. It should not be left in the warm atmosphere of the kitchen.

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FEEDING A FAMILY

As shopping, catering and cooking can usually only take a small proportion of the average housewife's time, some people make use of wireless programmes or the newspapers, telling them what is good value for money and the foods that are in season. Planned household shopping nearly always takes less time and in these times of attractive wrappers and advertisements encouraging buying, the shopper with a list of purchases to be made is less likely to be tempted to spend more than she originally intended. Helping mothers budget and plan good meals for the family is an important part of the health visitor's work.

PRESERVING FOOD

Food can be preserved by drying, salting, pickling, sterilizing it by heat, or freezing it. In drying by modern methods there is not much loss of the nutritive value except that of vitamin C. In salting food, the vitamin C is usually destroyed, but the vitamin B is unaffected. In jam-making, the rapid boiling removes the air and the jam will retain some of the vitamin C of the fruit from which it was made. Quick-frozen foods should be eaten as soon as they are thawed out or there will be a loss of vitamin C.

CONCLUSION

A good mixed diet is one of the best ways of preventing ill health, but there are so many factors involved in maintaining good nutrition that dietetics can never be a simple subject.

First and foremost the health worker must remember that the food needed must be available, people must have enough money to buy it, and having obtained the food they must have the inclination to eat it.

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Food habits are essentially personal affairs. They are built up partly upon tradition, so when it is necessary to introduce some new dietary requirement, this must be skilfully integrated into the person's existing eating habits. The pattern of eating depends not only upon custom, but upon the person's economy, the temperature and climate of his country, the nature of his work, sex and age.

Malnutrition may be caused by lack of food or the wrong food, also lack of fresh air and exercise. Overwork and fatigue, worry and emotional excitement all prevent a person from deriving the maximum benefit from the food he eats, which may be adequate in itself. Ideally a person should be relaxed and rested before taking a meal, and it should be remembered that violent emotions are no aid to digestion. The regularity of mealtimes is important, and the mother who provides good regular meals for her family and makes them a happy social occasion is doing a great deal for the happiness and health of her family.

Chapter 6

Mental Health

The physical conditions in which we live are important to health, but an individual's happiness depends even more on his mental state. If a person is doing the work he both likes and is suited for and he feels at one with the world in general, his environment will matter little to him.

Some people seem to achieve good mental health easily. They are the mentally stable personalities. They can adjust to changing circumstances and are not unduly upset by the ups and downs of life. On the other hand, there are the unfortunates of this world who can only adjust to life with difficulty, or not at all, as they suffer from a mental disorder.

In mental disorders there are distinct categories of patients. Those with mental subnormality have a condition of arrested or incomplete development of the mind and they may or may not be capable of living an independent life. In the case of mental illness, the patient's mind has reached full development but he has become mentally ill. In what is called psychopathic disorder, the patient has a disability of the mind resulting in abnormally aggressive or seriously irresponsible behaviour. He may or may not be of subnormal intelligence.

There are many people today who do not actually suffer from a mental illness nor are they mentally subnormal, but they have personality defects and are immature as persons. They react badly to stress and may break down if they are faced with many difficulties. They may need psychological guidance. If this can be given early in life many people can be helped to grow up emotionally and develop their personalities to the full.

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FACTORS IN MENTAL HEALTH

Good mental health is even more important than physical well-being. The mind and body are partners but the mind remains, as it were, the senior partner with the overriding interest in all the events of life. The way a personality develops and how an attitude of mind is formed depend upon a variety of factors.

First there is heredity which leaves its mark on every one of us. Heredity influences a person's intellectual ability and his temperament. The process of learning, good judgement and common sense, inventiveness are all part of intelligence. Temperamental differences which occur are constitutional. A person may be naturally vivacious and gay, another may have a great capacity for sustained effort and yet another may have a lazy disposition. We are all endowed with a certain kind of temperament. This in itself does not change but we can learn to control our behaviour.

The mother plays a very important part in the child's early environment. Each individual needs to feel loved and secure and it is the good mother who meets these needs. Whenever they are not met the strong emotion of love will be replaced by other emotions—those of anxiety, resentment, anger and finally despair. Every one of us needs to feel basically secure and the tiny child needs love and affection as a basis for his whole attitude to life. How we react to our environment depends upon this attitude. If we feel secure enough to approach life with an enquiring and open mind we are not likely to develop rigid personalities nor to block our outlook by prejudices and inhibitions.

Relationships with other people are first learnt in the family. Mother is first the all-important person to the young child and then the father and other members of the family come on to the child's horizon. He becomes involved in the intricate relationships of a group of people. Here in the family he learns to grow up emotionally. He learns to give and to share, to control his anger, to become master of his emotions instead of letting them master him. If he becomes emotionally mature he will be well equipped to cope with life in the community, whereas the child from a broken

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family who is more likely to be emotionally insecure may have difficulty in adjusting to life. First at school the child's emotional difficulties may affect his attainments there. He may be slow to learn to read, poor at mathematics, although his intelligence may well be above average. He may be a bad mixer and find it difficult to make friends. A child or one who is emotionally immature is easily upset by the irritations and frustrations of everyday life. He finds it hard to circumvent difficulties and to prevent problems from arising.

Fitting in to life in the community depends to a great extent on our previous attitudes and our emotional maturity. The well-adjusted person makes friends at work as well as with those who share his leisure-time activities. His capacity for friendship shows that he is capable of give and take.

Friendships have an effect on our mental well being but the friend must be the right sort of person for each individual. We often tend to judge ourselves by what our friends think and like to live up to their standards both spiritually and economically. A great deal of unhappiness is caused by some social or economic stress such as illness or other misfortune which may limit our friendships and also alter our former way of life. Mental ill health is often caused by some stress in life which that particular individual cannot stand up to. Some vital factor to the person's mental health is lacking.

EMOTIONAL DEVELOPMENT

Experience in living begins as soon as we are born. The feeling of being loved and secure is learnt from the mother. It is she who gives the baby the feeling of being wanted and kept from harm. The mother feeds the child and looks after his bodily and emotional needs. He is not unduly angered by being left to become hungry too long. If the mother is feckless and only feeds the child at irregular intervals, he will then become tense, angry at being starved, and then fearful. His anxiety will make him aggressive, and finally he will hate himself for being so. A whole pattern of insecurity and inability to cope with life is in the making.

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The child who has not had real love and understanding in his early years will be badly equipped for school life. He will not have sorted out his feelings of love and hate, rivalries and jealousies, and will be full of conflicting emotions. He may well retreat in the face of any difficulty, whereas the happy, independent child will have a feeling of inner security and an ability to cope with a new set of circumstances. His intellectual curiosity will rapidly increase and he will quickly adjust to a wider circle of acquaintances.

The overstrict parent tends to produce a child with a guilt complex for he feels that he cannot cope with the high standard set by his parent. He begins his school life feeling guilty and over-anxious and brings with him a train of mental ill health.

In adolescence, many of the fears of childhood are stirred up again. The boy or girl feels unsure of himself and his place in the world. He is sensitive and easily irritated and his moods often change rapidly. He learns that people are not infallible and becomes critical and defiant. If the home is not a stable one and the relationships between the parents are unhappy, the adolescent will almost certainly show signs of maladjustment. He will be aggressive, rebellious and may well indulge in juvenile crime.

Adults who are emotionally mature can love and be loved in return. If, however, emotional development has not been complete, the person may be unfitted for marriage. He or she may demand from the other partner the sort of love received in childhood. If all the wife longs for is dependency, then she will be incapable of an independent and emotionally mature relationship and sooner or later the other partner will find this irksome. There are many adjustments to make in marriage and only those who are capable of really good interpersonal relationships can make a success of it. It is not a cure for psychological problems or maladjustments.

It is obvious that the maladjusted person will find being a patient more difficult than the well-balanced individual who has learnt to adjust to circumstances. Physical illness and disability will accentuate any psychological problem which the person already possesses as well as bringing new anxieties and problems.

If you are worried and anxious because you have some problem to cope with and a difficulty to surmount you cannot deal adequa-

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tely with anything else you have to do. Until you have decided on what action to take and have taken it, you will be in a state of worry and uncertainty. When a reasonable course of action has been taken and the problem solved, you will be able to attend to whatever else you have to do. It soon becomes apparent that no one can really help anyone else until he has solved his own major problems. The inadequate personality cannot stretch out to give a helping hand to his neighbour because he himself is only too insecure.

Feelings of insecurity, anxiety and guilt arise in the mind of the individual who has not learnt to cope with his emotional problems. To become emotionally mature, all the stages of emotional development must be lived through and there are no short cuts. If any stage has been omitted the individual will remain emotionally immature in that respect until he has worked out that particular emotional problem. Helping people to become mature individuals often consists of giving them a helping hand until they can find the inner strength in themselves to master their difficulties. The key to the puzzle always lies in the mind of the person who has the problem and although how to solve it may seem perfectly clear to all around him, he himself is the only person who can solve the riddle, and he will often do so in the right way if he can be tided over a difficult time.

We are all such very different individuals from different backgrounds and with different needs and desires. Some are able to bear physical pain more easily than others and only need a little encouragement. Some can experience great grief such as a bereavement and yet turn away from their sorrow and make their lives happy ones. Others sit down, as it were, psychologically, and strive to live a full life no longer. They block all avenues which could still bring them happiness, and live with their grief for the rest of their lives. They seemingly cannot adjust to make a new life for themselves.

GROUP RELATIONSHIPS

In a ward where there is a happy atmosphere with the nurses

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getting on well together, the work will be done with the least possible strain emotionally. On the other hand, if the ward sister is a difficult personality this will tend to show up the difficulties, which everyone possesses to a certain extent, in keeping the equilibrium of her own emotional balance. Tempers will be lost, people will feel upset and even if the work of the ward is not heavy, everyone will feel exhausted before the end of the day. Certain people will tolerate one difficult personality whilst in another group, where the members are already perhaps in difficulty with their own human relationships, they cannot bear with yet another person who is difficult to get on with. Conversely, one outstanding personality can hold a whole group of mediocre people together and he or she can be the dominant factor in creating a happy atmosphere among them. If this personality leaves, the stability of the group may well collapse.

PSYCHOSOMATIC ILLNESSES

Emotional disturbance can cause a physical condition and this is what is meant by the term *psychosomatic illness*. The symptoms may be very real for the patient and include headache, sleeplessness, dizziness, etc. There may be an actual physical disturbance as, for example, with nervous dyspepsia, nervous diarrhoea and premenstrual tension or there may be an illness such as asthma, ulcerative colitis and dermatitis when there is both a psychological and a physical factor. In nearly every physical illness there is some association with psychogenic symptoms. Psychosomatic illness is associated with some emotional disturbance, perhaps only due to a passing stress in life such as falling in love or the taking on of great responsibilities. However, the illness in other cases may be due to a deep-seated fear of conflict which the patient unconsciously represses. Why he does this must be discovered and the patient helped to express his anxiety openly. When he does so, whatever was bothering him will seem less important and the physical symptoms may clear up although in some cases once a train of symptoms has been established its effects may be irreversible.

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THE NEUROTIC PERSONALITY

The neurotic and anxious person is very much in need of kindness. It is difficult to be always polite and considerate to others but the neurotic is least able to bear with the unkind word. If the stresses and strains of the day's work make us feel that there is a limit to the good manners we can show, then let us at least save up our good manners and all the kindness we can muster for the neurotics. They are already emotionally weary and let us not strain them even further by any unnecessary rudeness. However, kindness and politeness towards the neurotic does not mean allowing him to wallow in his neurosis. He needs firmness as well as kindness. If his neurosis is a means of evading responsibility and reality, firm but gentle handling may well help him to face real life and cope adequately with the circumstances.

The person with an anxiety state, or with hysteria when there is conversion of a deep-lying anxiety into physical symptoms, or the obsessional person, who feels he must carry out some ritual such as washing his hands again and again; all these are extremely anxious, worried people with a mental conflict. Above all they need reassurance. To tell them to pull themselves together and 'snap out of it' may well be most unhelpful, for indeed they would probably do so if they could.

THE DEPRESSED PERSON

It is quite normal to feel depressed at some loss or disappointment but normally our feeling of wretchedness does not last longer than a few hours or perhaps a day. In depressive illness there may be intense depression sometimes without apparent cause. The patient is intensely miserable and feels that he is a failure in life. Most patients recover in time but in their very depressed stage it is important to guard against suicide. They desperately need friendship and warmth and reassurance that their depression will pass.

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A number of patients are termed manic depressives. Their mood swings from a happy and elated state to one of acute depression.

THE PSYCHOTIC PATIENT

The patient who has a psychosis is out of touch with the real world. His behaviour is unpredictable and he is difficult to understand. He, however, lives in his own little world which to him seems quite a normal one.

There are many types of psychotic illness and all these illnesses may vary in their severity. In some cases, the patient recovers completely and in others, the patient may recover sufficiently to work and take some part in the world. With some patients their condition may be chronic.

SCHIZOPHRENIA

Many of the places in mental hospitals are taken up by schizophrenics. This illness may have many symptoms and the patient usually becomes more and more withdrawn from everyday life. These patients may have hallucinations and delusions and it is then impossible to reason with them.

ILLNESS FROM DAMAGE TO THE BRAIN

Some mental illnesses are the result of damage to the brain from diseases such as encephalitis, syphilis, the taking of various drugs, and alcohol. The mental symptoms have a definite association with an organic lesion.

Whenever a patient is confused and unable to look after himself his physical needs must be cared for. Friendship and calmness can do a great deal to help him and can sometimes bring him back to reality.

Many people who are mentally frail and unstable are to be found

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in the world at large. They live there as long as society will tolerate them and they are more likely to become normal individuals if they are not segregated away from ordinary life. The aim today is to try to integrate the individual into the community rather than send him away from it.

THE PROBLEMS OF BEING A PATIENT

If someone has to enter hospital as a patient for either a mental or physical complaint, many of the problems will be the same. Everyone feels uncertain and worried as to what is going to happen to him when he enters hospital. There is a completely new routine to get used to; perhaps different mealtimes and different times for bed and waking. He may be unaccustomed to sleeping in the same place with a number of other people. These are but a few of the differences from his ordinary pattern of living to which the patient must get accustomed. Above all he lacks the variety and stimulus of outside life, and monotony and boredom may be two of his greatest enemies. Some people find it extremely difficult to adjust again to the outside world when it is time for them to leave hospital and the protection of its walls.

REACTIONS TO ILLNESS

There is always an emotional reaction to illness. Everyone is afraid of having an operation and for operations such as hysterectomy and prostatectomy there may be added horror and fear. Another source of anxiety to the patient may be the hospital gadgets such as an electrocardiograph or any equipment which is unfamiliar to him. Some patients have a horror of spilt blood and they may be terrified of a simple blood test. The young child, above all, may suffer most in hospital from the feeling of separation from his mother. To him the separation is an eternity and the loss irreparable. He cannot think ahead sufficiently to know that his stay in hospital may soon come to an end.

Another reaction to illness is the feeling of helplessness it may

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bring. The patient may intensely dislike being washed by a stranger and any lack of privacy may seem to him very degrading. Eventually the patient may withdraw into himself or regress to childish dependency.

Institutionalism breeds apathy and submissiveness. The patient tends to lose his individuality and finds it difficult to make plans for the future. His relatives and visitors bring something of the outside world with them, but they too are affected by the limitations of the hospital and are under its authority. It is caring for one of their relatives or friends and therefore its rules must be obeyed. The patient is given a roof, he is fed and he is given treatment if he requires it. He lives an ordered life but the moving spirit of that life is not the individual himself. He is, in fact, only partly living.

After any illness it is the family and the patient's friends who are the most important people in the patient's recovery and in bringing him right back into the world again. It is very important for the nurses in hospital to have a friendly attitude towards visitors. They too need understanding and kindness, and it is not unheard of for the wife, whose husband is being comfortably nursed in hospital, to feel resentment that she is left at home with all the work to do, whilst her husband is living a life of comparative comfort, and has perhaps regressed to childish ways and a sense of dependency. His life runs on clock-work wheels whilst she has to make her own time-table according to the family, her job and other commitments. The man's homecoming may well feel to him like a sudden growing up, and a rude awakening to the ways of the world, and if the wife has been allowed to become resentful, the patient's return home will be all the harder.

Settling down on leaving hospital is far more difficult than adjusting to the hospital. As soon as a new patient has arrived the nurse therefore must plan ahead to prepare him for his departure. The nurse must think of her patient as a visitor now in a strange country who will return home as soon as he is able. Entering hospital he comes to a new world when sickness and strange surroundings depress him. He longs for familiar things. He looks for friendship and understanding in his anxiety, and the nurse must show that she is ready to try to understand him, and give him support

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and reassurance. She must be approachable and allow the patient to talk and above all she must learn to be a good listener.

There is nothing that makes one feel more isolated and self-absorbed than pain, and it is the nurse who can stimulate the patient's thoughts and prevent him from withdrawing into himself. The wider her interests the more help she can be to the patient. Every nurse needs her patients as much as they need her. They may like to think of her as a mother figure and she may feel flattered until she eventually finds she cannot live up to this picture of herself.

Many girls nurse because they long to feel needed and in their childhood many have felt unwanted and unloved. They must guard against the temptation to make patients too dependent on them. This can make it difficult for patients to recover the self-reliance they need to cope with their lives on leaving hospital.

Every nurse must try to come to terms with her own needs and anxieties and not let herself live out some unfulfilled need of her own at the expense of her patient.

The problems of mental health and physical health go hand in hand, and every physical illness brings problems which the mind has to face. If a person has sorted out all his emotional problems before an illness, his is a much easier road to recovery than the patient who has to come to terms with his emotional conflicts as well as a physical disability.

Some patients are physically ill but may also be mentally frail. Others may have some physical ailment but their chief trouble is some mental illness or disability.

THE PREVENTION OF MENTAL ILL HEALTH

It is much easier to prevent mental illness from occurring than to try to mend a broken mind. Now that the fear and shame which centred on mental illness and mental defect are diminishing they are becoming subjects which people feel they can discuss openly and there is a growing awareness of the importance of mental health.

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Good antenatal care and especially good care during the delivery of the child are factors which may prevent damage to the child's brain. Birth injury is certainly one of the causes of mental defect. Another cause of damage to the child's brain is the administration of excessive amounts of oxygen during the neonatal period.

German measles in the mother during the first three months of pregnancy may cause her to have a defective child. Syphilis in the mother may give rise to a defect in the child and it is thought that pregnant women exposed to the effects of atomic explosion and its radiations may be more likely to have abnormal children than mothers who have not been so exposed.

Another cause of mental defect is rhesus factor incompatibility. Severe neonatal jaundice may give rise to defect and some abnormalities such as mongolism and alkaptonuria are genetically determined.

Certain family weaknesses, be they physical or mental are transmissible down the generations. In a few cases of mental illness or defect, the specialist may advise against marriage to prevent insanity or subnormality being handed on. However, in most cases of mental breakdown there does not seem to be a hereditary factor. None of us is perfect and we all have our various weaknesses and under very great stress may break down, especially if we have not made a good adjustment to life.

If parents have a knowledge of the possible weaknesses which their children may inherit they can do their best to prevent stress in that particular direction and avoid the possibility of a breakdown. Some are more mentally frail than others who remain tough and resilient. The weaker brethren may need to live a protected life as they are not able to meet all the strains and stresses of a normal one. Provided that they are adequately cared for in certain respects they may well be able to lead useful lives.

Help can often be given to families to avoid emotional breakdown. The health visitor who may know the family well may notice stresses and strains in a home which have begun to appear and help the family to take steps to avoid a breakdown. The over-tired mother may well recover her mental equilibrium if she is given a holiday in time. The child who is abnormally docile may be the

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result of a particularly dominating mother and the health visitor may be able to point out to the mother that the child is becoming too dependent on her for his years and that he will later have great difficulty in making friends of his own age. Many of the early signs of mental stresses and strains can be detected and much mental ill health prevented.

Sometimes mental disorder is associated with organic disease and, when the physical condition is treated, the mental condition improves.

Some children break down during the adolescent stage. This sometimes occurs when an ambitious parent has pushed the child into some career or avenue of study for which he is not suited. Under the strain he breaks down for he cannot adjust to that particular work.

Fathers sometimes forget that their sons will not necessarily be good athletes just because they themselves were. If the children are forced to spend a lot of time on sport for which they have no aptitude, they will certainly revolt against this parental discipline. The father is unrealistic and does not want to accept the fact that his sons are not physically equipped to excel at games.

Adolescence is a time when a girl or boy finds himself no longer a child nor yet an adult. He feels unsure of himself and is anxious and sensitive of criticism. He has sudden changes of mood and may be depressed one moment and very elated the next. He is longing to throw off the dependence of childhood but finds it difficult to become independent particularly if his parents have been too protective. Growing up emotionally means learning to make one's own decisions and to shoulder responsibility. This will be difficult if there is too much discipline or if the parents are always quarrelling with each other. The result may be that the adolescent becomes rebellious, aggressive and perhaps a delinquent.

Abnormalities and weaknesses must be clearly recognized by the parents for what they are. It is no good pretending that they do not exist. The sooner the child faces his difficulties the better. It is far easier to begin to do so at home than later on in the world outside. The greatest help any parent can give to his child is a feeling of

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inner security which comes from facing reality in a stable home life where the child always feels loved and wanted.

Each child has a different place in the family and certain difficulties may be experienced by members of it by reason of their position. For example, a child may feel dispossessed at the birth of a younger brother or sister and great care is needed to make him feel still wanted by his mother. Otherwise he may grow up jealous, selfish and egotistic in self defence. Only children may suffer from lack of companionship of children of their own age and too much attention from adults. Conversely in a large family there may be one child who feels left out and unable to get her share of affection. If parents can recognize this and remedy it they can prevent much mental suffering.

Loneliness and boredom can accentuate and may precipitate mental ill health. This can be seen in the devoted spinster daughter who looks after an aged bedridden mother over a long period of time. The daughter tends to have an abnormal outlook on life from the sheer loneliness of her life and the narrowness of her horizon. Continual anxiety and worry may well cause her to break down unless she is given some relief.

Some hospitals now admit old people for the day and they return to their own homes each night. There is also a great need for more clubs for housebound old people. In some of the clubs, the housebound old person comes for one day a week, fetched and returned home by ambulance. The relatives know that they can have at least one free day when the old person is away and being properly cared for. This can often prevent a relative from breaking down mentally.

It should be remembered that an active old person sometimes needs a little help. The mind and body may move more slowly than before but often he can cope with most of the daily round if given a helping hand now and again. If an old person is lonely or bored he is much more likely to deteriorate mentally than someone who has many interests. Old people need variety and change just as younger people do and above all they need to feel wanted and loved.

In some old people there may be mental changes due to arteriosclerosis or deterioration of brain tissue; neurotic symptoms may

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become accentuated and a few of the elderly may become psychotic if they have inherited tendencies to psychosis.

Every one of us has basic psychological needs and if an adjustment cannot be made to meet one of these basic needs, in the right sort of way, we may make a wrong compensatory adjustment. It is just like a balloon filled with air which normally spreads itself evenly around the inside of the balloon. If there is a thin spot in the balloon wall, air will bulge through making the curve uneven.

Basically we all need love and affection. If we feel unloved and unwelcome we may become depressed, tense, angry or jealous. Our need has not been met. The grown-up son of a widower may resent his father marrying again but if he is sufficiently mature emotionally he will realize that his father needs the affection that his second wife can give him. The son will not expect the home to be exactly the same as when his own mother was alive. The love and affection he needs he should then seek outside his own home in marriage.

COMMUNITY CARE AND MENTAL HEALTH ACT

The Mental Health Act, 1959, concerns all those suffering from mental disorder. This may be a mental illness in someone who has previously appeared to be normal; or it may be subnormality in a person who has arrested or incomplete development of mind; or it may be a psychopathic disorder in which there is abnormally aggressive or seriously irresponsible behaviour requiring treatment.

The main principle of the Act is that as much treatment as possible, both in and outside hospital, should be given on an informal, voluntary basis and that as far as possible the patient should live in the community rather than in an institution. It also makes provision for the patient where compulsion is necessary either in the interests of the patient or of society. Compulsion is only used if hospital care for the patient is essential and he cannot be persuaded to go there of his own accord. Application must be made by the patient's nearest relative or a mental welfare officer, and this must be supported by the recommendation of two doctors. He may then be admitted to hospital for observation and necessary treatment

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for a period of 28 days. If it is essential for the patient to remain in hospital and receive further treatment after this period, the patient's consent to stay informally must be obtained or a new application for an observation period of 28 days made. In an emergency, a patient may be admitted to hospital for seventy-two hours with only one medical recommendation. A second medical recommendation must be given if further detention is necessary.

Some mentally ill or mentally subnormal patients who are not able to look after themselves are placed under guardianship. The guardian, if a private person, must be approved by the local authority. The guardian is required: 'so far as is practicable to make arrangements for the occupation, training or employment of the patient and for his recreation and general welfare and to ensure that everything practicable is done for the promotion of his physical and mental health.'

Some of the patients may be able to work in occupation centres which some local authorities provide for the mentally subnormal. For those who are recovering from mental illness, the day hospital which he can attend, although living at home, may be a great help. There is a great need for training and occupation centres and for special residential accommodation from where the mentally handicapped can go out to work during the day. They return there in the evening and live under supervision. These hostels which are usually run by the local authority can be of enormous value in helping patients who are slightly subnormal to take their place in the world. They could be called half-way houses. Whether a patient is mentally subnormal or has been mentally ill, he often needs a helping hand from someone after leaving hospital before he can become independent. In many cases this help is given by the patient's own family, but where this is not possible, the local authority gives what help it can in training and supervision.

When any of these patients learns to live happily and independently it is a great achievement for himself, the family, and the team of health workers who have worked towards his recovery.

Chapter 7

Infection: Micro-Organisms and Other Parasites: Immunity

INFECTION

In human beings an infection occurs when a living organism, which may be a virus, a bacterium or a protozoan enters and establishes itself in some part of the body. The man in the street talks of 'germs', and in the popular sense the word is useful in giving the idea of something alive attacking and entering the bodies of humans or animals. The word 'germ' though unscientific, is also helpful in suggesting to us that these living infective organisms are small and in most cases invisible to the naked eye. The majority of the viruses are a group of very small organisms even beyond the reach of the ordinary microscope, though they may be portrayed by the electronic microscope.

The recognition of infective organisms or 'germs' as the cause of many human diseases in the latter part of the nineteenth and the first decades of this century, led to the greatest triumphs of medicine. The researches started by Pasteur and Koch were extended by many other workers so that such diseases as cholera, typhoid, dysentery, plague, tuberculosis, malaria, smallpox and many others came to be more fully understood. The micro-organisms which cause them were discovered, but what was even more exciting, the way these organisms invade the human body was found out; and then came the next step of immense practical importance

Micro-Organisms and Other Parasites

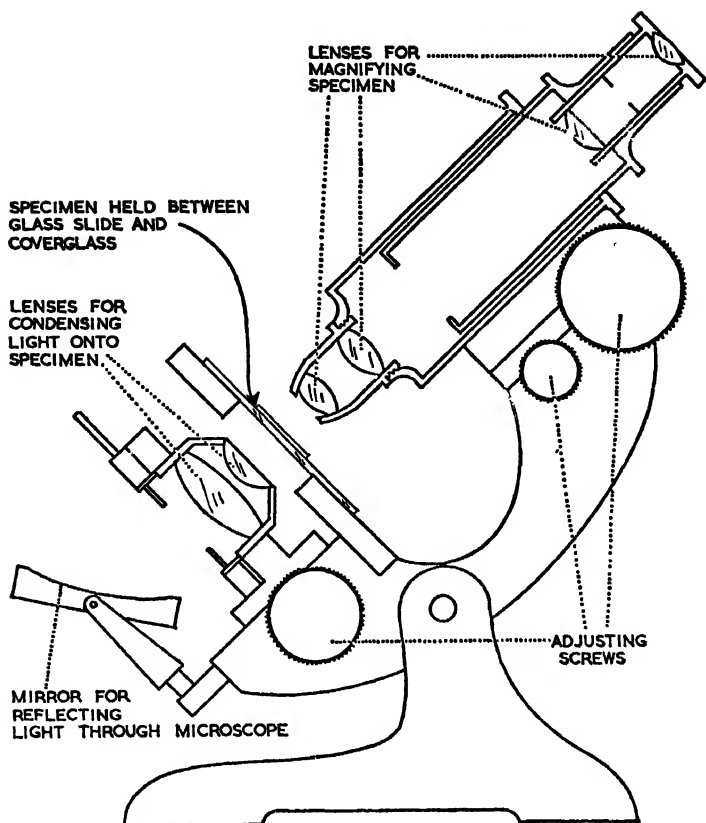


FIG. 2. Microscope

when it was possible to develop methods of preventing and treating many of these diseases. So, today, in most advanced countries the nursing or medical student knows only of cholera, typhoid, smallpox, plague, diphtheria and other conditions from his text-books. He rarely sees an actual case.

MICRO-ORGANISMS

These are a numerous group. They occur in all lands, in water,

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in soil, on the surface of everything, in plants as well as animal life. They are of many types of which very few are harmful. The harmful ones are to be found as the cause of many of the diseases of any form of life be it that of plants, fish, animals or humans.

Those causing human disease belong to a number of different kinds of which the main groups are:

(i) **Viruses.** These are the simplest and smallest of micro-organisms. The majority are not visible even under the high power of the optical microscope. Hence the term ultra-microscopic. Several, however, have been pictured with the electron microscope. The biochemists and virologists are not yet confident that they can always say whether a complete system of molecules is but a chemical arrangement or is a living organism—a virus, i.e. whether such chemical compounds are but inert compounds or contain life. Viruses have hitherto been impossible to identify or study apart from living tissue. In the laboratory it has been necessary to 'grow' them in living tissue such as in chick embryos.

Human diseases due to viruses include measles, poliomyelitis, smallpox and trachoma. Following the discovery of the method of 'growing' viruses in the laboratory in animal 'cultures', vaccines against some of these diseases have been produced (See Fig. 3).



FIG. 3. Viruses and Bacilli as seen under the microscope

Smallpox vaccine has the longest history, going back to the discovery of Edward Jenner, the Gloucestershire physician (1749-1823), that cow-pox was able to protect humans against smallpox. This was because the virus of smallpox was able to 'grow' on the skin of a calf and it produced a vesicle there or cow-pox. It was found that dairy maids who had accidentally 'vaccinated' themselves with cow-pox when milking did not contract smallpox.

(ii) **Bacteria.** These are larger and somewhat more complex than viruses. They exist everywhere, in the sea, land and air. They are

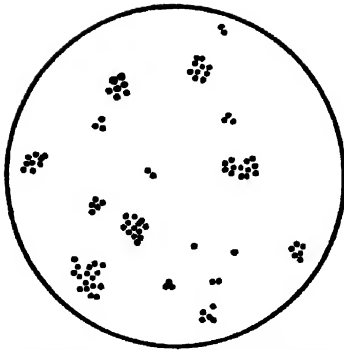
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classified into a number of different groups according to such qualities as their shape, their appearance when 'grown' in or on different materials in the laboratory, the type of chemical action they produce in such substances as sugar solutions and their behaviour in nature such as, for example, in causing disease.

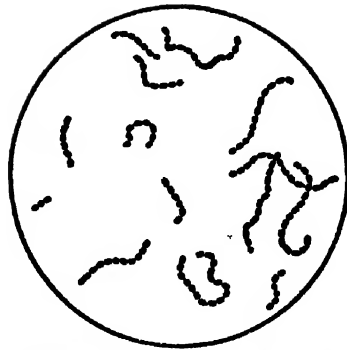
There are but few of the many thousands of bacteria which cause disease in plants, animals or man. This small group, however, includes the greatest 'killers' of man, other than man as a 'killer' himself. Bacteria, with viruses have been the cause of the great epidemics and pandemics in the past—plague, cholera, typhoid and the dysenteries. Tuberculosis and pneumonia are also due to these organisms. Until Pasteur and Koch discovered the existence of bacteria and Lister showed how to prevent them infecting injuries and wounds, bacteria were responsible, apart from the great epidemics, for death and damage to many millions (see Fig. 4).

Certain bacteria entering a cut or a wound are likely to cause suppuration or infection. In simpler cases similar suppurating or pyogenic (pus-forming) organisms lodging in a skin duct or even minute abrasions lead to such conditions as boils, abscesses, and skin and subcutaneous septic conditions. In many circumstances the pus bacteria are able to cause infection because the skin has not had, or has lost, its usual very marked power to resist invasion by organisms. Sometimes this failure is a result of general constitutional disease (malnutrition, hormone deficiencies, etc.), but in others the reasons are not clear.

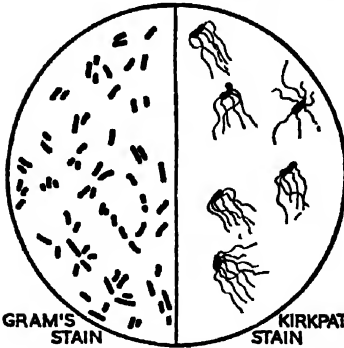
Hospitals even up to the last century earned the reputation of being death-houses and this was mostly the consequence of patients being infected with pus-producing bacteria while in hospital. Even the simplest 'break' in the skin resulted in severe toxic infections, usually followed by massive septicaemia and death. Wounds rapidly became gangrenous. So saturated were such hospitals and everything in them with virulent 'septic' organisms that every surgical patient automatically suffered secondary infections, of which a high proportion were fatal. This frightful state of affairs was first cleaned up by the *anti-septic* methods of Lord Lister, the great Scottish surgeon. He used antiseptics on



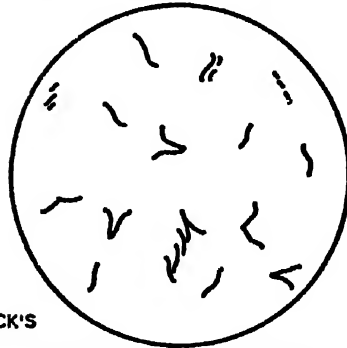
STAPHYLOCOCCUS PYOGENES



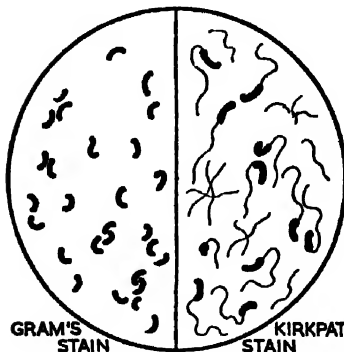
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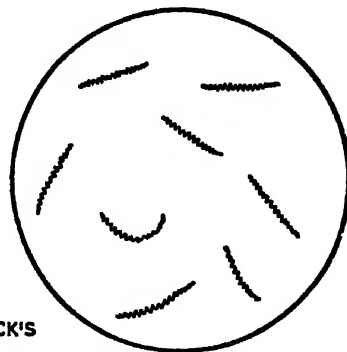
GRAM'S STAIN KIRKPATRICK'S STAIN
BACILLUS TYPHOSUS



BACILLUS TUBERCULOSIS



GRAM'S STAIN KIRKPATRICK'S STAIN
VIBRIO CHOLERAЕ



SPIROCHAETE

FIG. 4. Some bacteria as seen under the microscope

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everything connected with the patient in the operating theatre and in the wards. The patient's skin and wounds, dressings and instruments were all rigorously treated with antiseptics. The surgeon and the nursing staff of both the theatre and the ward also carefully prepared their hands.

Following the antiseptic methods, *asepsis* was developed to prevent harmful bacteria, mostly staphylococci and streptococci entering surgical wounds or those caused accidentally. The principle practised in asepsis is scrupulous cleanliness of everything and is the reason for the care taken by the surgeon and the theatre staff in the 'scrub-up' before entering the operating theatre. This is why wounds or incisions being dressed are kept free of anything but sterile bandages and instruments. It explains too the insistence on only properly sterilized dressings, bandages, solutions and instruments used in hospitals and clinics. No micro-organism must be allowed to contaminate or infect a patient.

It is very unfortunate that in recent years, hospital or ward secondary infections have become troublesome. This has followed the appearance of strains of bacteria, mostly of the staphylococcal type which are resistant to antibiotics. It must be remembered that bacteria only get into wounds because methods of asepsis have failed and sepsis in hospital has reminded doctors and nurses again how important it is to be strictly clean in all their work and to take meticulous care to prevent contamination of hands, dressings, bandages, utensils, instruments, indeed everything in a hospital.

A different type of contamination enables other bacteria to kill and harm mankind. *Contamination* or *pollution of water* was the cause of the great epidemics of cholera and typhoid. The bacteria responsible were of different types—cholera being caused by a curved-shaped bacterium or *Vibrio cholerae*, and typhoid by one of a rod-like group known as the *Bacillus typhosus*, or *Salmonella typhi*, of which types A, B and C are the commonest. These particular water-borne diseases have declined dramatically wherever proper water treatment has been introduced, as, for example, the chlorination of water supplies. The water-borne diseases are almost unknown in the advanced countries of Western Europe and

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North America. Where living is insanitary, with human wastes not carefully removed, personal habits filthy and water supplies unprotected, cholera and typhoid still occur. Cholera, because of the habits of the more delicate vibrio, is a tropical disease, while typhoid occurs more widely.

Dysentery is another bacterial disease which can be carried by water or food infected by the stool of someone harbouring the bacilli. The three types of bacillary dysentery are Sonne, Flexner and Shiga. Some dysentery is endemic in Britain and, although it is usually a disease lasting only three or four days, in a young child or elderly person it may be fatal. The germ is passed in the stool and if it is then conveyed to the mouth of another person it can cause the disease characterized by abdominal pain, diarrhoea and vomiting. It is always spread by faulty hygiene.

Salmonella typhimurium is another type of bacteria found in infected food which multiplies there and can cause enteritis in the people who eat the food. As with dysentery, the enteritis is originally caused by unclean habits. Streptococcal diseases, such as scarlet fever and tonsillitis, can also be carried by food as also can the germs of tuberculosis and undulant fever.

Examples of bacteria carried by air are the pneumococcus causing pneumonia, the corynebacterium diphtheriae causing diphtheria, and strains of streptococcus and tuberculosis. Tuberculosis of the lungs is nearly always the result of persons predisposed to the disease being infected by tubercle bacilli which they have inhaled. The organism is a curious one varying from a small rod (= bacillus) to long, thread-like forms.

The *Clostridium tetani* is the bacillus or rod-shaped bacterium causing tetanus. The germ can always be found in manured land as it lives in the intestines of cows, horses and other animals. The germ enters the human body through a wound. Anyone therefore who has had a wound contaminated with dust or earth should be given tetanus antitoxin. Another bacillus which can be found in the soil is *Clostridium Welchii* which causes gas gangrene if a wound is infected with this bacillus.

A form of bacteria known as the spirochaete is a spiral in shape. The disease most commonly associated with such organisms is

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syphilis, caused by the *Spirochaeta pallidum*. Like the gonococcus, which causes the other most prevalent venereal disease, gonorrhoea, the spirochaete is delicate and dies quickly away from human tissue. These diseases are thus spread usually by direct contact with infected human mucous membranes. Apart from diseases borne by insects such as fleas, lice or itch mites which live on humans, direct contact, however, is rarely a major means of spreading infectious diseases, for the human skin, when unbroken, is disease resistant.

(iii) Protozoa. Viruses and bacteria are so undifferentiated or relatively simple that it is not customary to speak of them as being in the animal or vegetable kingdom. Protozoa are more complex and are classified in the animal kingdom. Protozoa, like bacteria, are everywhere. The great majority of them are free-living, i.e. they exist in water or soil and are not parasitic. The popular and interesting method of revealing the wonders of pond-life is to look at a drop of pond water under the microscope. It teems with a variety of fascinating protozoa. They are single-celled like bacteria but usually have various special features such as cilia (hairs), stomata (mouths), or vacuoles. Also like bacteria, very few species of protozoa have become agents of human disease. But those that have show a strange range of habitat and mode of spread. There are the simpler protozoa like the entamoebae found in the lower intestine and the cause of amoebic dysentery. The malarial parasites, the plasmodia, are more complicated, having different stages in human blood and the mosquito's body.

(iv) Fungi. Apart from the broad group of micro-organisms mentioned above there are a number of other living things which are the cause of human disease and these include fungi. Perhaps the best known of the free-living fungi is the ordinary mushroom. Each fungus has the characteristic of forming spores. Ringworm of the scalp and skin, and the disease, actinomycosis, where a fungus grows in the skin to produce large masses, are human diseases due to fungi. A fungus disease sometimes causing trouble in schools and barracks is 'athlete's foot'. It is a curious name, because it is by no means peculiar to athletes or swimmers, though there is a belief that it is frequently associated with bathing cubicles and showers in

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schools or sports clubs. Its more scientific name is *Tinea interdigitalis* which is a guide to its cause—a fungus or *tinea*, and its site of occurrence, i.e. in the space between the toes. These areas become irritable and inflamed. Then ulceration follows leading to secondary, or being produced by secondary, infection. Cleanliness and dryness of the skin, especially between the toes, is a safeguard. Rigorous scrubbing and disinfection of floors and floorboards are claimed to prevent the spread of the fungus.

Fungi, like bacteria, are to be found everywhere in nature. Like bacteria also only a relatively small number are harmful to man or animals, of which those already mentioned are the commonest—the ringworms, the actinomycoses, and the *tinea* infections. However, some strange and rare fungal infections occur in the lungs, obviously due to certain fungi being inhaled and, in exceptional cases, growing in the lungs.

ANIMAL PARASITES

These are of a large variety and are to be found in all regions of the world. Again, however, the warm, moist, tropical areas show the greatest prevalence, as conditions there are the most suitable for their life, growth and spread. These parasites are the multi-cellular forms, as distinct from the uni- (single) celled *entamoebae*, *plasmodia* and *trypanosomes* described elsewhere. Such multi-cellular parasites may invade or establish themselves according to type in any human tissue or organ. The large variety of helminths ('worms') are the most obvious. They include roundworms (*ascaris*), found as a pencil-shaped parasite in the gut; the long tapeworms, originating in infected beef or pork, and the separate male and female worms (*schistosomes*), causing *bilharziasis* (*schistosomiasis*), the hookworm, so general an infection in warm countries with moist, swamp conditions, and such infections due to poor personal and family hygiene as the threadworms and the whipworms.

In view of their importance in public health a little more needs to be said about some of these worms.

Micro-Organisms and Other Parasites

The *threadworm* (*Enterobius vermicularis*) is one of the commonest internal parasites of white people and infection by this worm is called oxyuriasis or enterobiasis. The adult worm is from half to 1.5 cm. in length and lives in the colon or caecum. The eggs are usually laid around the anus and passed out in the faeces, which may infect water, food or finger-nails. Clothing, bedding or dust are common means of infection.

The *roundworm* (*Ascaris lumbricoides*) is common in countries, particularly with warm, moist climates, where personal and communal standards of hygiene and sanitation are low. The male is about 6 inches in length and the female is slightly longer; the larger worms have their habitat in the small intestine of man, see Fig. 5.

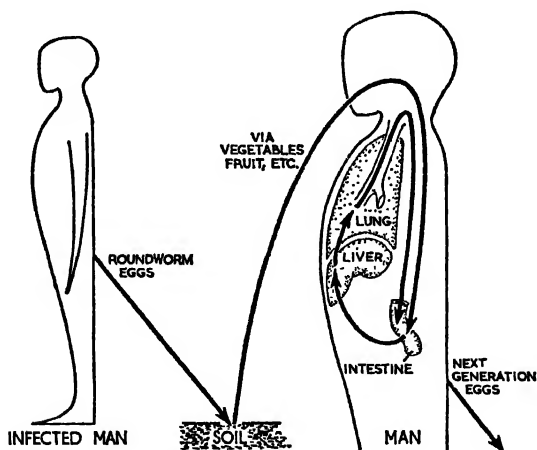


FIG. 5. Diagram showing the path of infection of a roundworm

In occasional infections the number of worms in the intestine may be sufficient to cause severe discomfort and even obstruction. The female produces large numbers of eggs which pass out with the faeces. Contamination of vegetables or other food may then occur accidentally or more usually by the use of human wastes as agricultural fertilizer. Such food then results in the eggs hatching in the intestine, but the adult worms only develop after the embryos

Micro-Organisms and Other Parasites

have passed through the gut to the liver into the lungs. From here the young worms make their way to the oesophagus and hence back to the small intestine to settle as adult worms. Their presence is confirmed by the detection of the tell-tale eggs in the examination microscopically of specimens of faeces.

The *tapeworms* (*Taenia*) are doubly important in public health. They are human parasites in one stage of their complicated life cycles. In addition, the occurrence of another part of their cycles in meat, either beef or pork, is of importance to hygiene. Food, badly needed in some regions, must be rejected and destroyed if such an

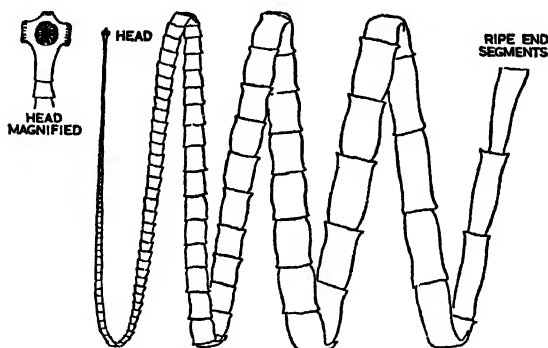


FIG. 6. A tapeworm

infection is present. Besides depriving a population of food its economy suffers in that the farmer or rancher who has raised the cattle or pigs loses heavily. There are two tapeworms of special importance to medicine and agriculture. Cattle are the source of the beef tapeworm (*Taenia saginata*), and pigs of the pork tapeworm (*Taenia solium*). Their life cycles are roughly similar. The adult worms, like tapes, may grow to several feet and inhabit the human smaller intestine. There is a head with suckers and hooklets which embeds itself in the wall of the gut. Then follow the segments, numbering several hundreds in a well-grown worm. The last segments become ripe and mature, each being complete and full of eggs. The segments pass out with the faeces.

The next phase in the life-cycle occurs when faeces containing

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such eggs are swallowed directly or through contaminated vegetation being eaten by cattle in the one case and pigs in the other. In the gut of the animal the eggs hatch out to release larval forms which pierce the gut and migrate to the muscles. Here they lodge themselves as 'cysts', and remain dormant. If the muscles (meat) containing such cysts are then eaten by man, the cysts, larval forms, on reaching the small intestine attach themselves to the mucous membrane to grow into new tapeworms in the completion of the cycle.

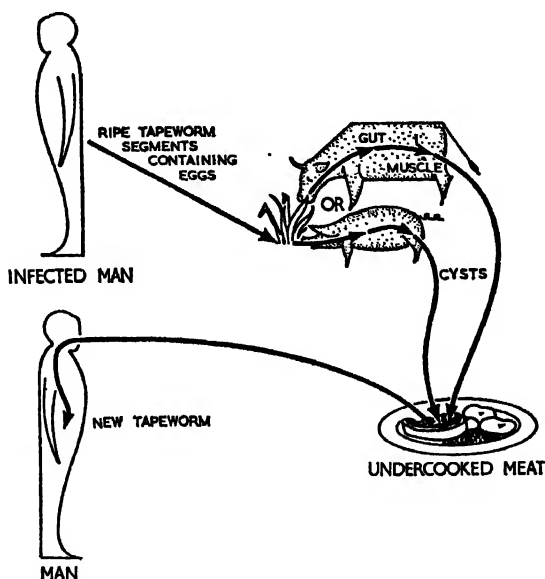


FIG. 7. Diagram showing a path of infection of a tapeworm

The *hookworm* (*Ancylostoma*), the worm which causes anaemia and debility in so many tropical countries is also spread by human faeces contaminating moist soil and swampy ground. The worm is small, less than an inch, but does much damage, when numerous, by its attachment to and feeding from the mucous membrane of the small intestine. The eggs passing in the faeces on to moist ground hatch out as small worm-like larvae. These penetrate the skin of

Micro-Organisms and Other Parasites

people walking barefoot or otherwise exposed to moist or swampy ground. Thus through the lymphatics and blood vessels they reach the lungs, and, like the larvae of the roundworm already mentioned, make their way up the bronchi to the oesophagus and then to the gut to start their life-cycle anew as adult worms.

The *schistosoma* or *bilharzial* worm has two chief forms, one, the commoner, causing urinary, and the other rectal schistosomiasis. Both types of disease are found in tropical and sub-tropical zones. In humans the lesions or damage of the common type of worm are caused in the bladder, and in another type in the rectum. The worm forms male and female schistosoma, and they imbed themselves in the walls of the human bladder or rectum according to type. Here they cause ulceration and bleeding, which explains why blood in the urine in the one type, and blood in the faeces in the other are the chief early symptoms. When the worms are mature the females produce eggs, which pass out from the human bladder in the urine or from the rectum in the faeces. Microscopic examination of urine or faeces of such cases will show the oval eggs with their distinctive spines. If such contaminated urine or faeces reaches water, say in a river, pond or irrigation canal, the schistosome eggs develop into small, almost invisible, free-swimming forms, miracidia, which have a short life of less than three days. If these forms reach certain species of snails they invade their tissues and form another stage of the parasite. The parasites in the snail divide into large numbers of another form which burst out and enter the water in which the snail lives. This is another free-swimming stage and this form is known as cercaria. It has only a short life of less than three days under the usual, warm, tropical conditions, and dies if within that time it does not find a human being to invade. Touching the skin of, say a bather in an infected river, or a labourer in a flooded field the cercaria pierces the skin and, by a roundabout path, eventually settles in the bladder wall in one type of bilharziasis (schistosomiasis), or rectal wall in the other. Here it grows into either a male or a female fluke to feed on and destroy the tissues of its human host. In due course the female begins to pass eggs out and so the life-cycle of the schistosoma parasite is completed.

Micro-Organisms and Other Parasites

Other worms exist which cause human disease by infecting animals which are the source of human food, but they need no special mention here. However, it is well to recall that helminths are not peculiar to humans. Worms are to be found in all animals, and when they are serious enough to affect a large number of animals used for man's food, like cattle, sheep and poultry, they affect his food supply and harm his economy. It is in such conditions that human and veterinary medicine join hands in working for the public health.

IMMUNITY

When a number of people are in contact with an infectious disease not everyone becomes ill with the infection. Even amongst those who become ill, some may be seriously ill and others only slightly so. At some times such a disease may be more harmful, making many people very ill, while at other times only a few are affected very slightly. These happenings show that an infectious disease depends not only on a germ (or micro-organism) but on such other factors as the virulence of the germ and the resistance of the human beings to the germ. Some micro-organisms are more virulent than others and true smallpox is due to a virulent germ. Influenza in some years, such as in 1918, is a killing disease, at others it is very mild. This is due to the change in the virulence of the influenza micro-organism.

But even virulent organisms do not attack everyone with the same severity. Some people owe their resistance to a *natural immunity*. Some people are born with more immunity than others. Others become immune to one or more diseases because they have had attacks of these particular diseases. Such attacks may vary from causing serious illness to conditions so mild as not even to show symptoms. Most adults are immune to the so-called childhood infectious diseases such as measles, German measles, whooping cough and mumps. This is so even though many have not had recognizable attacks of these diseases. Nevertheless such people have had very mild forms which have stimulated the defences of

Immunity

the body, the immunity system, to make it resistant to such infections. Even more virulent diseases like smallpox, yellow fever, cholera, malaria, dysentery and others produce immunity.

It is the occurrence of immunity after infection which is the basis of the process of *vaccination* and *immunization*. We all know today that there are immunization campaigns against smallpox, poliomyelitis, and diphtheria, and that travellers by air to many countries must carry vaccination certificates for such diseases as yellow fever and smallpox.

Most immunity of this kind is known as *active* immunity, as the defences of the body themselves resist the disease in question. Active immunity is therefore the result of a previous attack of the disease or of a vaccine. A vaccine is to be considered as acting like an infection in stimulating the body's defences. A vaccine is made in a variety of technical ways in the laboratory using the micro-organisms of the disease against which protection is desired. The care with which vaccines are now made has removed practically all the unpleasant reactions which previously sometimes occurred after vaccination. It is very rare that any trouble now follows smallpox, yellow fever or poliomyelitis vaccination.

Most vaccines are still only possible as injections beneath the skin (subcutaneous), though smallpox vaccine is scratched into the skin. However, there are oral vaccines for some conditions, of which that against poliomyelitis is a recent example. The pattern of immunization offered to children in Britain is given on p. 227.

Passive immunity follows the injection into the body of serum containing the antibodies of a disease or diseases. It is usually only of very short duration. The serum may be taken from a human being who has had the disease, such as measles, or be a special extract such as gamma globulin. When diphtheria of a serious kind was more prevalent, and active immunization had not generally been carried out, passive immunity was obtained by injecting serum containing antibodies. This was helpful in preventing attacks in those recently exposed to infection and in those suffering from an acute attack.

Chapter 8

Communicable Diseases

A communicable disease is a condition caused by a living micro-organism or parasite of the kinds described in the previous chapter. However, the presence of such an organism is but one factor in the spread of a disease.

Diseases vary in the degree of infectiousness. Smallpox is a highly infectious disease as it spreads rapidly in a community which has not been immunized. Measles is similarly infectious in children, but fortunately is generally a mild disease, except in children under three years of age. Thus diseases vary in the virulence of the causative micro-organisms and in the susceptibility of the communities in which they occur.

Communicable diseases also vary in type and prevalence according to climatic conditions. The warm and humid tropics are notorious for the high incidence of the excremental diseases, see Fig. 8, where food or water are infected by micro-organisms passed in the faeces of patients or 'carriers'. In such regions, too, such insect-borne diseases as malaria, dengue, and filariasis are common.

The nature of the environment in which people live also influences the occurrence of several communicable diseases. Airborne infections such as measles, scarlet-fever, and tuberculosis spread most easily in overcrowded slums, especially in houses with bad ventilation and which are not kept clean. In such communities, too, the inhabitants suffer from excremental diseases and contract infections such as ringworm and scabies.

In the following notes some facts are given concerning the principal groups of communicable diseases.

Communicable Diseases

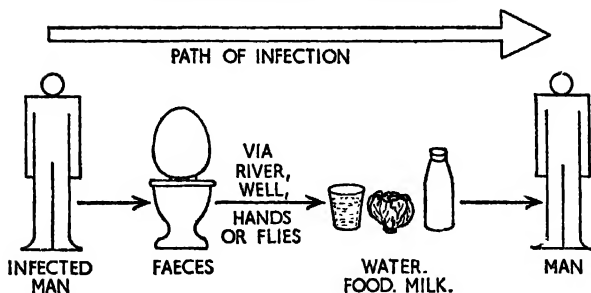


FIG. 8. The path of infection in excremental disease

PYOGENIC OR PUS-PRODUCING INFECTIONS

The causative organisms are staphylococci and streptococci. Staphylococcal infections arise more commonly from organisms on the skin, infected lesions (boils, abscesses, etc.) or hands or materials directly contaminated; streptococcal infections are more usually from the throat and mouth. Discharges from the original source, whether it be a boil, an abscess, a tonsil or infected skin, are a means of passing on the infection by direct contact, by aerial transmission or through the medium of blankets, clothing, utensils or the hands of nurses or patients. 'Carriers' are a difficult factor in control and prevention.

Staphylococci cause boils, carbuncles, abscesses and, more rarely, food poisoning, pneumonia and septicaemia. The organism, by entering the bloodstream, may also produce multiple abscesses in any part or organ of the body. Strains resistant to penicillin or antibiotics and drugs, have led to serious problems in hospitals. Indeed staphylococcal infections arising in contaminated hospital wards and theatres have demanded most rigorous and heroic methods of control and aseptic techniques.

Streptococci of human importance are haemolytic in type. They are more widespread and cause a variety of diseases. Infection passes from a patient by direct contact of infected fingers, or by droplet infection originating in throat, nose or mouth lesions, or indirectly from blankets, clothing, instruments, utensils or, more

Communicable Diseases

occasionally, milk which has been infected by a streptococcal patient or carrier.

The infections these cause include skin conditions like erysipelas and impetigo, lymphangitis, tonsillitis, scarlet fever and puerperal infections. Septicaemia may follow some streptococcal lesion on the skin or mucous membrane.

CHILDHOOD INFECTIONS

These diseases termed childhood infections include diphtheria, measles, German measles (rubella), mumps, whooping cough and chicken-pox. They occur in children in the average town or city community. Infection may, however, occur at any age in a person or community not frequently exposed to the infection. Some severe outbreaks of disease have followed visits by outsiders to hitherto isolated groups in islands or country areas. Such happenings are largely past history now in a world where travellers reach the remotest islands and traverse every jungle and mountain. The mode of infection is alike. It is aerial or droplet-borne. An attack usually produces lifelong immunity.

Diphtheria is a throat infection in typical cases caused by a slender bacillus, and spreads through the organism being coughed or breathed out (droplet infection). It is serious as the diphtheria bacillus produces toxins which, absorbed from the local throat or, more rarely, nose lesion, cause general toxæmia. This toxæmia may cause heart failure or nerve paralysis.

Measles is caused by a virus which is highly infectious and so most people are early infected by it. Infection passing from person to person is air-borne. Patients are most infectious in the early pre-clinical catarrhal stages. Catarrhal symptoms of the eyes, nose and throat are followed by a rash and, in complicated cases, by bronchitis and even broncho-pneumonia, intestinal and nervous system conditions.

German measles is confused frequently with measles because of the generalized skin rash but is practically never more than a mild ailment of short duration. There is one exception, however, in that a woman who catches rubella in the first three months of her preg-

Communicable Diseases

nancy may then have a congenitally malformed child. If a woman who has not had German measles in childhood is known to have been exposed to the infection early in her pregnancy, she may be given gamma globulin to try to prevent an attack. The air-borne or droplet transmission of this virus is again, like measles, most likely to take place in the early catarrhal stages.

Mumps is also due to a virus but is much less infectious than measles or rubella. Droplet transmission is the method of spread. Following the initial symptoms in the mouth and salivary glands, particularly the parotids, complications may occur. Orchitis in the male is the most well known, and its tendency to cause sterility makes it serious.

Whooping cough is another respiratory, air-borne condition but its infective agent is the pertussis bacillus, not a virus. Distressing though the attacks of coughing are, it is the secondary complications of bronchitis and broncho-pneumonia which make it a serious disease especially in very young patients.

Chicken-pox has its skin rash as its most distinctive feature. It is a rash showing crops of macules, papules and pustules spread in a characteristic fashion over the body. It appears most profusely on the body and in the axillae and groin. The face, hands and feet show few lesions.

This distribution of the rash in crops in different stages and types of lesions is diagnostically important. Both in the interests of the patient and the community it is essential to distinguish chicken-pox from the far more serious smallpox. Though diagnosis is the primary responsibility of the attending doctor, the nurses or the health and medical aide may help by noting the various features of the rashes and their time of appearance. The smallpox rash does not usually appear in successive stages of macules and papules. The smallpox rash is also usually more profuse upon face and extremities than on the trunk. Both chicken-pox and smallpox are due to viruses, and are highly infectious by air-borne transmission. Chicken-pox is much the milder disease and rarely has any complications other than possible secondary infection of a pustule.

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INFLUENZA AND THE PNEUMONIAS

Influenza is caused by a virus which varies in seriousness. There are different strains of the virus which explain this. At intervals, usually of years, a very toxic and infectious strain of the influenza virus will appear and, spreading rapidly, will cause great epidemics and even pandemics. The last notorious pandemic was that of 1918 which caused many millions to die throughout the world. The cause of death was chiefly due to the secondary, complicating broncho-pneumonia. The explanation of the rapid spreading of influenza lies in its respiratory form of transmission. In times of epidemics there is a combination of toxic strain with a susceptible population to produce the rapid spread with many victims.

Pneumonias. The coming of antibiotics has changed the nature of pneumonia as a serious and frequent disease and an important cause of death in adults. Now the disease is rarer and less serious. Its cause, the pneumococcus, has a respiratory aerial spread.

Broncho-pneumonia is usually a sequel to other infections, several of which have been mentioned in this chapter, namely measles, whooping cough, and influenza. It also complicates occasionally such respiratory infections or conditions as 'colds', bronchitis, scarlet fever, etc.

Viruses, streptococci, and staphylococci appear as the cause in different cases. Streptococcal types are frequently serious.

TUBERCULOSIS

Tuberculosis is a disease which has been in the world for thousands of years. Egyptian mummies show tuberculous bone lesions. In its respiratory, air-borne form causing pulmonary tuberculosis it has been a major public health problem in all countries. It still is one of the serious conditions in communities badly housed and working in poor surroundings. These disadvantages are aggravated where rural peoples take to the new life of close-packed towns and mass industry. The association of the prevalence and severity of pulmonary tuberculosis with bad living and working conditions

Communicable Diseases

makes it one of the so-called 'social' diseases'. Those societies which are able to secure good housing and progressive economic conditions and adequate health and medical services happily reduce the disease to insignificance. But in the 'under-developed' countries, still to develop economically and socially, tuberculosis is a major challenge.

Pulmonary tuberculosis, indeed most human tuberculosis today in the more advanced countries, is respiratory and air-borne in origin. Other tuberculosis, particularly forms affecting bone, joint and gland, may be caused by animal (bovine) strains of the tubercle bacilli.

Human type tuberculosis originates in the lung or respiratory tract lesions and is transmitted aurally. Bovine type disease is spread by infected milk. In both types the disease develops slowly; tuberculosis is a chronic disease. However, inhaling or ingesting the tubercle bacillus does not automatically produce illness; indeed most humans do absorb such micro-organisms, as they do most respiratory and many alimentary types, but it is usually only the small minority who subsequently become ill. Definite tuberculous disease thus means the causative organism, the bacillus, developing in a human being who is susceptible because of lack of, or reduction in, natural immunity or some temporary lowering of resistance caused by malnutrition, or the debility of other diseases.

Tuberculosis is thus an index of the sanitary conditions in a community. Where housing is good there is little overcrowding in ill-ventilated rooms. The tubercle bacilli are not then so massively and continuously present in the inspired air. The inhabitants are well fed, physically well and protected from diseases so are resistant to the tubercle bacillus.

POLIOMYELITIS AND MENINGITIS

Poliomyelitis and similar diseases of the nervous system are caused by a large number of related viruses. The spread seems to be associated with ingestion rather than inspiration of the causative organisms. Practically all members of a community become infected in a literal sense but it is a minority who suffer any illness,

Communicable Diseases

and of these, very few develop the serious, paralytic forms. At present the most satisfactory means of countering these effects of widespread polio-virus is in immunization with polio-vaccines.

There are various relatively rare virus infections of the brain (encephalitis), but note is taken here of a central nervous disease called *cerebro-spinal meningitis*. This is yet another example of disease patterns being changed by modern control and treatment. Meningitis is most frequently, as a primary disease, caused by the meningococcus, but other, rarer forms are due to a variety of micro-organisms. Most, however, are relatively easily controlled by modern drugs or antibiotics.

FOOD POISONING: DYSENTERIES: TYPHOID FEVERS

These diseases follow the entry into the body of the infective micro-organism in food, milk or water. The organisms are all members of the same family of bacilli known as salmonellae. They are many in number and vary in the type of disease they cause from the acute, immediate gastro-enteritis of food poisoning, to the longer, more generalized, toxic course of the typhoid fevers.

The great epidemics of typhoid have followed the pollution of water supplies by sewage or faeces containing the organism in question. Improper disposal of human wastes and inadequate protection of water, food and milk explain the existence of persistent or repeated outbreaks of each of these types of infection.

The dysenteries are more common in the tropics. This applies to both those due to bacilli (salmonellae), and those due to entamoebae. In both cases contaminated food is the source of infection.

Food poisoning is usually due to food contaminated with salmonellae (food poisoning bacilli), but occasionally other micro-organisms or even chemical contaminants are the cause. Insufficient care in keeping hands and utensils, and kitchen, café or restaurant premises clean, or the failure to protect vegetables, milk, meat, or especially the eating of re-done or re-cooked foods are the conditions favouring food-poisoning. A number of people becoming ill with vomiting and/or diarrhoea soon after sharing a common meal is usually due to food-poisoning.

Communicable Diseases

QUARANTINABLE DISEASES

There are five diseases in this group: cholera, plague, smallpox, typhus and yellow fever. They are a mixed group in every way; different types of micro-organisms cause them and the mode of spread varies widely: They have become associated because of their international history in which they have been the great pestilences spreading along trade routes, causing frequent disastrous epidemics and pandemics. It was fear of these diseases and the loss to international trade following drastic stoppages in the name of quarantine that led to inter-governmental sanitary conventions and ultimately to the international health organizations of today.

Cholera is an acute, intestinal, toxic disease caused by the vibrio cholerae spread by contaminated water.

Plague is of two kinds, bubonic, spread by fleas passing to man from infected rodents, or pneumonic, where the bacillus, the pasteurella pestis, is respiratory in origin passing aerially from human to human.

Smallpox is caused by an air-borne virus passing from human to human.

Typhus is caused by a small micro-organism, the rickettsia, passing from man to man through infected body lice and head lice.

Yellow fever is caused by a virus which is transmitted from man to man, or from certain primates (monkeys) to man by various species of tropical mosquitoes.

Chapter 9

Control and Prevention of Communicable Diseases

The various facts already given about the nature of communicable diseases, the organisms that cause them, the life cycles of the parasites, the processes of immunity and the circumstances in which these diseases occur, all give a rational basis for preventing and controlling them.

Each disease takes a certain course in infecting mankind. It may be attacked at various points on this course. Its causative organism may be eliminated in an infected person so that he is no longer a source of danger to others. The resistance of a person may be increased by immunization or, at certain times and in certain cases, by giving drugs or antibiotics. The actual means of spreading the disease may be interrupted or broken in a variety of ways, as, for example, when water is purified to prevent cholera, typhoid and other excremental diseases; when milk and food are protected from infection by high standards of personal and communal hygiene; and when insects, rodents and other vectors are destroyed.

Many diseases are prevented from occurring and the health and morale of a community are enhanced by good general health and sanitary measures. These include careful personal hygiene; good housing; pure food and water supplies; full and proper disposal of human wastes and garbage; destruction of flies, mosquitoes and rodents; and full medical and hospital care for families. These all combine to give the best preventive medicine. General campaigns of health education in schools, youth groups, industry and among the public are also essential to instil the principles of health.

Control and Prevention of Communicable Diseases

PREVENTION

EXCREMENTAL DISEASES

These include typhoid fevers, food poisoning due to salmonella infections, dysenteries, cholera and some parasitic and worm infections. As these are spread by infected food and water the measures required are:

- Personal cleanliness, especially for cooks and other food handlers
- Washing of hands before meals
- Cleanliness of food shops, restaurants and hotels
- Protection of food (meat, milk, vegetables, etc.) from contamination and dirt
- Avoidance of uncooked food in special cases
- Purification of water supplies
- Proper disposal of all wastes; this also reduces fly-breeding
- Occasionally, in special cases, immunization
- Control of 'carriers'. Known carriers must not be employed in handling food for the public.

INSECT-BORNE DISEASES

These include typhus, malaria, typhoid (to a slight extent) and plague. The measures required are:

- Disinfection of persons and clothing to kill lice
- Destruction of mosquitoes, in both the larval (in water) stage, and the adult stage
- Destruction of flies. The fly is prevented from breeding by removing and disinfecting garbage and filth; insecticides such as D.D.T. are used to kill any flies that reach the adult stage
- Destruction of plague-carrying rodents
- Treatment of human cases. Isolation of potential sources of infection when necessary.

Control and Prevention of Communicable Diseases

AIR-BORNE DISEASES

These include tuberculosis of the lung, influenza, diphtheria, scarlet fever, whooping cough, pneumonic plague, and the pneumonias. Such diseases are more difficult to prevent directly because of the impossibility of purifying air in any practical way. However, means of prevention are:

Avoidance of overcrowding, especially in public places

Through ventilation, so that the air in rooms is changed

Isolation of cases is of only slight help as infection also comes from people other than those obviously ill. The infection can be spread by minor cases and carriers

Treatment of cases, and immunization where vaccines have been developed, such as for diphtheria and plague. Vaccines against tuberculosis and influenza are only partially successful.

CONTACT DISEASES

These include scabies and the venereal diseases. In a more general sense typhus, ringworm and some other fungal conditions are also contact diseases as is pediculosis. Lice (pediculi), cannot live unless on human hair or on the inner surface of clothing next to the warm skin. Lice are thus delicate organisms and soon die away from the human body. They travel from one human to another, therefore, usually by contact of body or clothing. Ringworm too is usually transferred by its spores passing directly from one person to another, or from dogs or cats to human beings.

The gonococci causing gonorrhoea, and the spirochaetes of syphilis are exceedingly delicate micro-organisms which cannot exist unless in the human body or on its mucous membranes. In both diseases the most infectious phase is when the organisms are in and on the mucous membrane and skin of the genital organs. Thus contact is the source of infection. However, in the second and tertiary stages of syphilis any other tissue or organ, such as the skin, bone, blood vessels, or the nervous system may be invaded. Involvement

Control and Prevention of Communicable Diseases

of other parts of the body is uncommon in gonorrhoea but may occur in the joints.

In syphilis, the secondary skin and mucous membrane lesions, which are usually ulcerations, are infectious.

The most obvious method of dealing with contact diseases is to prevent contact. This is not necessarily easy. In ringworm and scabies, fortunately, radical cleanliness with shaving, scrubbing and the use of modern drugs destroy the organisms and stop their spread. Lousiness is similarly controlled by treatment of clothing and bedding. Lice spread in a population whenever it becomes disorganized and demoralized. Wars, famines and civil disturbances have thus been the occasions when lice and typhus have brought disease and death in great epidemics. It was the preventive and control methods developed during the Second World War which at last stopped the threat of typhus. Firstly the old methods were used:

- (1) ridding people of lice and nits by soap and water
- (2) disinfecting their clothing and bedding by hot air or steam disinfection methods
- (3) treating the sick in isolation.

Then the idea of dusting the population with anti-lice powders was applied. This dusting technique was successful even before D.D.T. powders were available. Today lice and typhus are very easily controlled with blowing D.D.T. powder on the hair of lousy persons and under their clothing. So typhus has at last lost its destructive power.

The prevention and control of *venereal diseases* has proved complicated even now when the power of destroying the infections of gonorrhoea and syphilis with penicillin and other antibiotics is so very high. Venereal diseases have been almost entirely associated with sexual relationship. The cases which arise from contact with lesions other than those of the genitals are rare. Venereal diseases have frequently in the past been the subject of police measures, of moral and social campaigns, and of appeals to codes of behaviour and religion. Controversy has been fierce as to whether, for example, individuals should be given advice or information on medical methods of avoiding these infections should they expose themselves to their dangers.

Control and Prevention of Communicable Diseases

Public health and medical authorities in the past, however, have had to depend upon a widely conducted system of control and prevention. The diseases were examined and discussed openly but objectively. The public was given information on their nature, their causes, the consequences of infection and the personal methods of prevention. The need was emphasized of seeking early treatment both to prevent others being infected and to avoid the more serious later complications in the individual patient.

Besides the more direct measures of dealing with venereal diseases, educational and social campaigns to develop personal and community responsibility, to provide interests such as sports and recreation have been carried out as all these play an important part in prevention.

Schools, public associations, religious bodies, youth movements and all similar groups have been enlisted to help the attack on such diseases as the venereal diseases, for they cannot usually be controlled by purely medical means. Yet it was only after the use of the antibiotic treatment of syphilis and gonorrhoea that a dramatic change took place. The numbers of cases in nearly all countries have now dropped considerably. The previous serious, destructive, killing and crippling heart, bone, nervous and other complications have almost disappeared. This conquest has been one of the most successful and happiest stories in preventive medicine. But there is a 'but'. As in so many situations, so in venereal diseases, change is always occurring. In recent years in both Europe and North America there has been a rise again of infection. Several factors are responsible. Social conduct is laxer so opportunities for infection have increased. Resistance to drugs seems to be appearing in some of the strains of gonococci and spirochaetes. As well as this the public and the health authorities have become slack in dealing with what had seemed to be a group of dying diseases.

CONTACTS

To put the contacts of an infectious disease in quarantine is of debatable value in preventing its spread. Most diseases spread through a variety of ways. Infection may come from the frank or

Control and Prevention of Communicable Diseases

obvious case; from the incubating case, often impossible to detect; from the carrier, usually diagnosed only by complicated and laborious clinical and laboratory tests, or from the very mild sufferer, who, like the carrier, is also rarely discovered. To quarantine, i.e. to isolate 'contacts' only, who are, at best, a vague group, is to deal with only one small possible source of infection. Usually, general methods of public health, good housing, sanitation, health education, and vaccination are more effective. *Carriers* are persons carrying an infection usually for a prolonged period but not showing any obvious signs of illness. Persistent carriers are best known in connection with typhoid fever. Many notorious outbreaks have been traced to cooks or kitchen workers who have been carriers, i.e. excreting typhoid bacilli, and so, through failure to keep their hands clean or similar sanitary lapses, infecting food, water or milk. Carriers are associated too with diphtheria, scarlet fever, dysentery and similar infections. To rid such persons of their infection is sometimes exceedingly difficult.

In special situations there is advantage, even a duty to search for and deal with carriers who are shown to be the source of repeated and persistent outbreaks of disease. Thus in the type of case already mentioned carriers of typhoid should be excluded from handling and cooking food in restaurants, schools and other institutions. In groups—usually children living closely together in school or orphanages—diphtheria may owe its persistent presence to carriers. Previously, in wartime, carriers have explained many of the serious outbreaks of cerebro-meningitis. A narrower but sometimes more tragic type of carrier is the medical attendant or nurse. A throat, or ulcer or skin condition in such a person may spread haemolytic streptococci or resistant 'hospital' staphylococci to many patients.

Cross-infection is the term used to describe the disease which attacks a patient in a hospital and which originates in and is due to the conditions in that hospital. For example, a child being treated in hospital for chicken-pox contracts diphtheria; or a surgical patient suffers secondary pyogenic infection.

Cross-infection is particularly associated with children's hospitals and wards as so many children have not developed adequate resistance and immunity to the commoner infectious diseases. Indeed the

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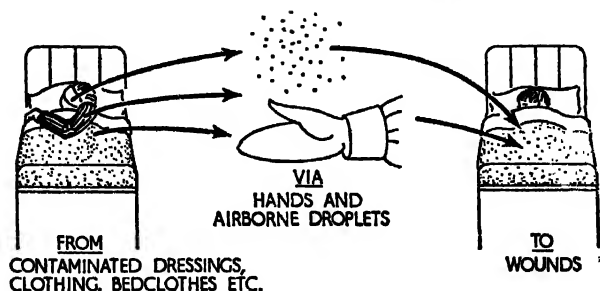


FIG. 9. Diagram to show how cross-infection occurs

likelihood of cross-infections in such young groups has been one of the important disadvantages of sending children to hospital. It also explains the difficult and elaborate arrangements in the design and nursing in special cubicle infectious diseases wards. Much responsibility is then placed on the nursing staff in visiting, feeding, treating and generally caring for the patients.

DISINFECTION AND DISINFESTATION

Measures of disinfection and disinfestation are undertaken to eliminate infectious micro-organisms in the one case, and insect parasites of medical importance in the other from persons, goods or premises. These terms are to be distinguished from antiseptic and aseptic procedures. Antiseptic procedures were mainly associated with operations of the last century and were designed to ensure that micro-organisms did not grow in wounds, injuries, on the skin, on dressings or on instruments. Aseptic procedures are directed to ensure that micro-organisms are eliminated or prevented from entering similar situations, wounds, skin, etc. Asepsis results in complete sterility of the materials or agents involved—dressings, instruments, surgeon's and nurse's hands at operations, etc.

Disinfection uses such physical means as simple washing and scrubbing with water and soap, hot air and steam at high temperatures and pressures. Modern technique in hospitals and health

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departments in aiming at complete disinfection relies upon specially designed apparatus to apply superheated steam at pressure.

In the ordinary home and working place much, and even adequate disinfection for most needs may be obtained by scrubbing with soap and water and boiling such articles as are made of glass, china and metal. This destroys most micro-organisms and spores. The value of fresh air and sunlight must also not be forgotten.

Chemical disinfection depends upon a variety of substances. There are the phenols and cresols into which group come carbolic acid and picric acid. There are the alcohols and glycols and there are the aldehydes such as formaldehyde. Some disinfectants are acids. Iodine and chlorine are halogens. Other disinfectants may be oxidizing agents like the peroxides; heavy metals such as mercury, silver, zinc or copper. There are also surface active compounds such as benzalkonium chloride and dyes such as the acridine dyes and the fluorescein dyes.

Disinfestation is a justifiable term in public health in reference to the special procedures to kill lice in clothing and blankets; bed-bugs in furniture and housing; mosquitoes and flies in planes or ships; ticks in tropical huts; and insects affecting food.

Until World War II hot-air disinfestation was a common measure for dealing with lousy clothing or bedding. However, it was cumbersome. Steam disinsectization was, and is, more efficient but was more difficult to improvise.

In public health campaigns today the ideal method is the chemical one. In the case of lousy people anti-lice dusts, usually containing D.D.T. are blown under clothing and on to hair and skin by simple hand 'guns' or blowers (see Fig. 10). Clothing and bedding may be similarly treated. Bed-bugs may be destroyed by steam used against articles of furniture, but this is usually undesirable because of the damage it does to such articles. Room disinsectization or fumigation is effective using such means as hydrocyanic gas, obviously a dangerous procedure and only to be undertaken by experienced staff. More usually and equally effective in most situations is the application of modern insecticides containing D.D.T., Gammexane and the like to furniture, rooms, etc. Attention is still necessary to floor or wall cracks and spaces. The use of atomized sprays of D.D.T.

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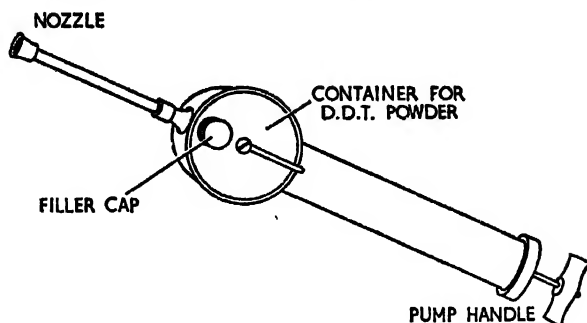


FIG. 10. D.D.T. dusting-gun

and the other newer insecticides is the modern method for dealing with adult insects and their larval and egg forms in planes, ships and other transport, in houses, huts, caves or wherever they are a public health problem.

Clothing or personal belongings should not be burnt. Serious public and psychological difficulties may follow such drastic action.

INTERNATIONAL MEASURES OF CONTROL

It was the devastation of the spread of cholera, plague and small-pox last century, especially along trade routes that alarmed governments. There followed a series of quarantine conventions. Quarantine is the term used to describe the measures for isolating an infection or preventing its entry into a community. It particularly applies to those measures required officially by governments against trade and travellers, or by local authorities (towns, cities, etc.) against patients, carriers or contacts of listed (or notifiable) diseases. The international measures are intended to control the spread of smallpox, cholera, typhus, yellow fever and plague. They require the isolation of a case of any of these diseases; the holding of ships or aircraft with persons so infected on board; the disinfection of baggage and goods; the destruction of rats and lice; the rat-proofing of ships and ports; the disinsectization of aircraft; the destruction of the yellow

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fever mosquito (*Aedes aegypti*) in the areas of international ports and airports; and finally the obligation on travellers, especially those moving by air within the incubation period, to carry vaccination certificates against yellow fever and smallpox. Many of these measures, especially when applied too arbitrarily by port quarantine officers are very damaging to international trade and obstructive to the movement of travellers. Holding passengers, ships and aircraft in 'quarantine', i.e. not allowing them to move or to have contact with or move goods into a community is very costly and cumbersome.

Chapter 10

Some Insects of Medical and Health Importance

Insects can be responsible for transmitting disease to human beings, or for causing ill health or economic or social problems. The insects mentioned here are those of most interest in Europe but they also include certain insects significant in other regions.

DOMESTIC FLIES (*Musca domestica*)

Besides being annoying, domestic flies are dangerous to health as vectors of the human excremental diseases, and in dry, tropical areas, as a factor in the spread of trachoma and secondary eye infections. These roles are the result of their breeding and feeding habits.

The female fly (see Fig. 11.) deposits batches of eggs several times in the summer season in rotting organic matter, manure, garbage or human excreta. Such materials also are the food of these insects. But, as is only too obvious, flies have a restless, roving flight, and are attracted by humans and animals, where they seek out the moist surfaces of the eye, nose or mouth, or a wound or ulcer. They also settle on human food, or cooking and eating utensils. Disease micro-organisms (bacteria, worm eggs, protozoa), are thus picked up by the flies from garbage, manure or faeces and mechanically transferred by them to infect human food or a person himself.

If the weather is warm and breeding material is abundant, the domestic fly soon produces enormous numbers of progeny. The egg in the breeding place, which may be manure, hatches out in a day or two as a white larva or maggot. Feeding upon the material in which

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it was cradled it matures in a few days as a brownish pupa. In another few days the adult fly breaks out of this pupal case to complete its life cycle. Knowledge of the life cycle of the fly, as of any other insect, gives the clue to methods for controlling and eradicating it. As flies breed rapidly and in huge numbers, there is great advantage in attacking their breeding places. Careful and regular removal and

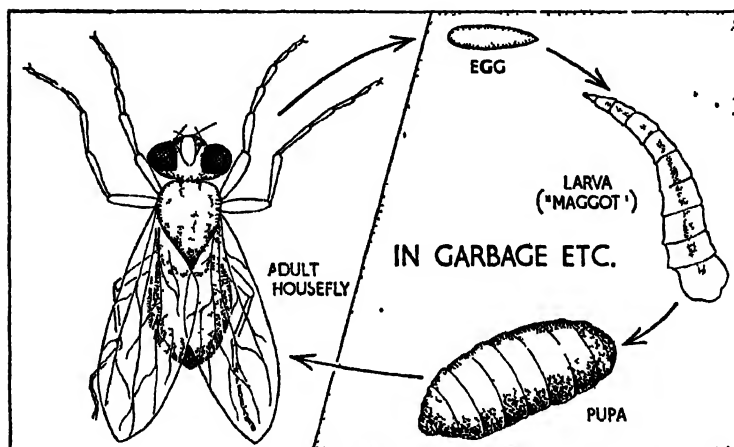


FIG 11. Life cycle of a Fly

proper disposal of any material in which breeding could occur, reduces flies to insignificant numbers very quickly. Thus efficient waste removal and disposal services are necessary as the basis for fly control. Previously, in poorer and less well-developed countries where such efficiency was unattainable, flies were a chronic and serious public health menace. The new insecticides, D.D.T. and its successors with their effective and persistent action on surfaces on which they are sprayed, have, however, almost eliminated flies and many other insects. This has been possible even in areas handicapped by bad sanitary conditions. The appearance of strains of flies resistant to insecticides is a sign that the battle against flies has to continue.

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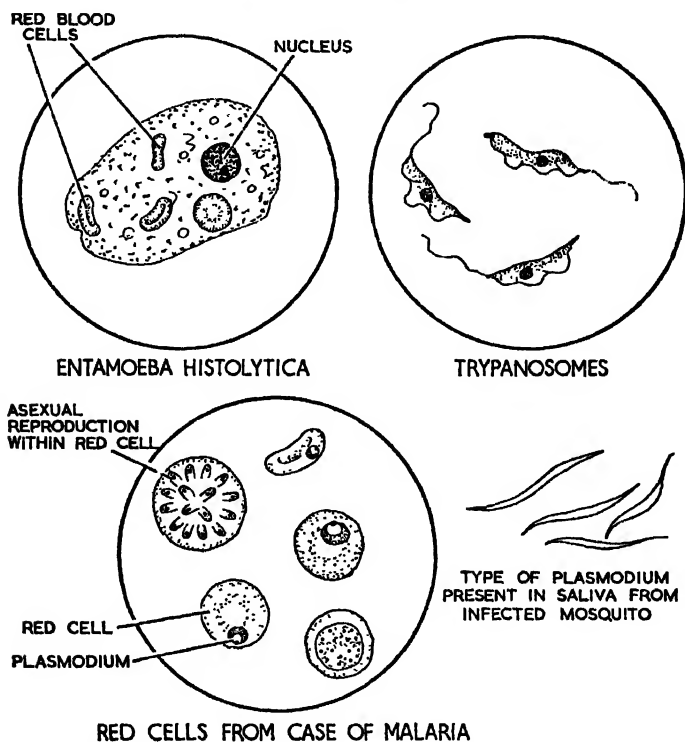


FIG. 12

MOSQUITOES

These insects are a serious danger to health in tropical and semi-tropical regions, especially because certain species are vectors of a number of human diseases. First in importance are the Anopheline species (See Fig. 13) which spread malaria. Then there are the Aedes species which are the vectors of yellow fever. Other species are responsible for carrying dengue fever, filariasis and a variety of virus conditions. Though most species are annoying to humans by their biting habits, not all species have humans as their source of food, and not all those that do so carry human disease. Many animal diseases are spread by mosquitoes.

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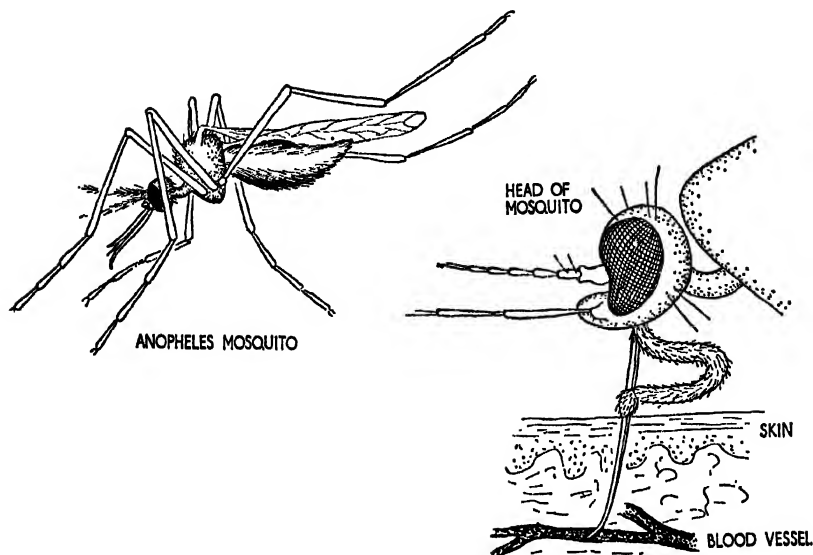


FIG. 13

The breeding cycle of this insect (See Fig. 14), is always linked with water. The eggs, usually in batches, are laid in water in which the successive stages of larva and pupa also have their existence. The cycle, from egg-laying to the development of the adult, takes from 10 to 14 days under optimum conditions. Temperature is the critical factor, for under about 55–60°F. (13–16°C.) most species of mosquitoes cannot breed. Blood is essential for egg production and is obtained from biting humans or warm-blooded animals. It is the female adult which bites, as blood is necessary for the development of the egg. The life cycle of the mosquito species, vectors of human disease, vary greatly. Some breed only in sunlit waters, others in brackish swamps, others in small, undisturbed collections of water. These facts have to be discovered before the best measures for destroying the insects can be developed. Hence the preliminary work in controlling mosquito-borne disease is the detection of the particular species carrying the disease such as malaria, yellow fever or filariasis. Then in turn the habits of both adult and larval form must be known.

Some Insects of Medical and Health Importance

Before the use of the modern, long-lasting insecticides, control and prevention of malaria and the other mosquito-borne diseases usually required measures against all stages of the insect and the

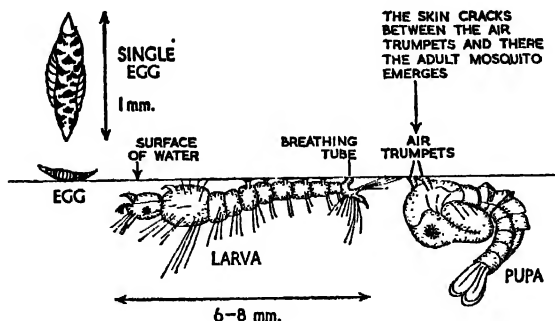


FIG. 14. From the egg stage to mosquito

malaria parasite. The prevention of its breeding by filling in swamps or clearing river edges, or by oiling exposed water was most successful, and the destruction of adult mosquitoes by sprays also played a part. Protection of human sleeping quarters by netting, and of the body from bites by suitable clothing both come into the general campaigns against malaria.

D.D.T. and other synthetic sprays are now the means of choice against all stages of the mosquito, both in the water and in the air. However, the special lasting effect of these insecticides after being sprayed on walls, ceilings and other mosquito resting places, has made the destruction of the adult mosquito more worthwhile. Though in many areas the measures taken to destroy the adult mosquito are sufficient to control malaria and other relevant diseases, as a general principle and to achieve the best and long-lasting results, all measures should be taken. Breeding places should be eliminated or controlled, the larval and adult mosquito should be attacked, and measures taken to deal with human cases and to protect the population at risk.

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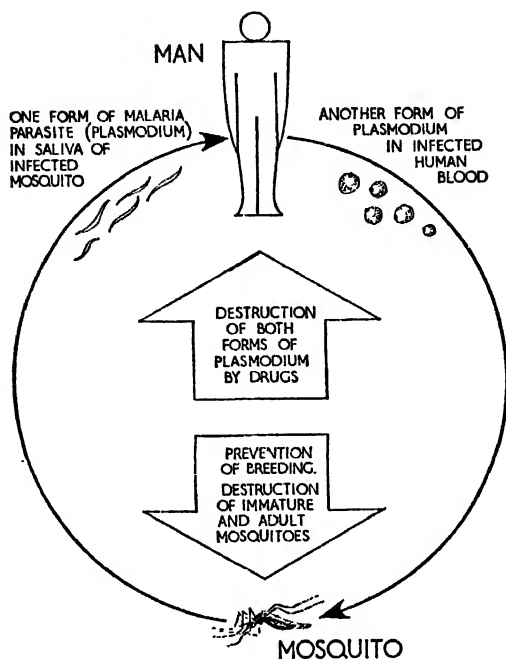


FIG. 15. Path of infection in malaria

FLEAS

Not all species of fleas concern man, nor are all human fleas of medical importance. The disease vectors are fleas which carry the plague bacillus from infected rodents to man. There are several different species involved in spreading plague in various parts of the world, those of general interest being species of *Xenopsylla*.

The common human flea (*Pulex* sp.) is not a factor in plague but is of health concern in that it rapidly becomes a nuisance in slums. This flea (see Fig. 16), breeds rapidly in poor housing conditions and soon infests large numbers of people.

The female flea lays eggs in crevices of furniture or flooring. As in all insect-breeding cycles, temperature and humidity determine the rate of breeding. If these are suitable, the eggs produce minute

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larvae which, after several days form pupae. Then in about a fortnight the adult fleas emerge from the pupal cases.

The control and prevention of fleas must be directed mainly against their breeding. Even simple house-cleaning, by sweeping up dust and dirt, and washing floors and furniture with soapy water is

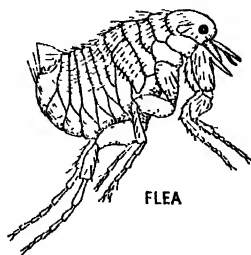


FIG. 16

very effective in ridding premises of fleas, provided it is carried out regularly and vigorously.

Insecticides of the long-lasting type, (D.D.T. and other modern synthetics) are again most effective in destroying larvae and adults, when sprayed on floors and furniture. They are effective too in the form of dust sprays for dealing with fleas on bedding and clothing, even that worn on the person.

LICE

Body lousiness is evidence of poor personal and communal cleanliness, and so of poverty or social backwardness. Such conditions have almost always been aggravated in times of mass human disasters such as wars, famines or the flight of refugees. Hence the louse-borne disease typhus has been a notorious companion of these unhappy, human tragedies through history until the present era. The simple means of blowing insecticidal powders on to the inner surfaces of clothing as worn and on to bedding was evolved by the Middle East Force in the Second World War. This method,

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especially using D.D.T. and simple insecticides, rapidly destroys lice, and so has ended the fear of mass typhus.

Lice (see Fig. 17a) are sensitive insects and need the warmth of their human hosts to survive and breed. The louse (*Pediculus*) lays its eggs in folds or seams of clothing and bedding, where the eggs may be seen as minute, whitish grains. The adult insects mainly remain on the inner surface of clothing but bite the wearer to obtain their food which is human blood.

In many poor communities, especially among the children, a variant of the body louse is a serious nuisance. This is the head louse,

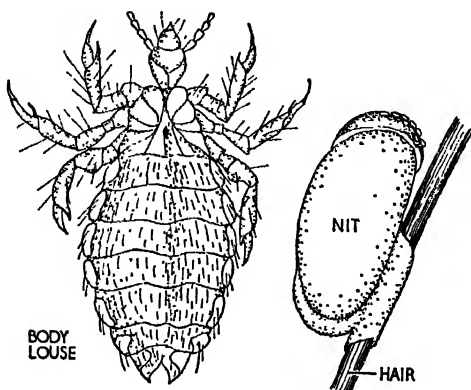


FIG. 17.(a) Body louse (b) Nit of head louse

which has its being in the hair of the head. In this species the eggs ('nits', see Fig. 17b) are cemented on to the hair as they are laid and when discovered are signs of infestation.

Another variant is the pubic louse (crab louse).

Control and prevention of lousiness calls for a general, public campaign of cleanliness and louse destruction. Washing of the body, its clothing and bedding at regular intervals stops body lousiness. However, simple though it seems, personal cleanliness is not always easily or cheaply to be found. Especially in communities disturbed by war or civil disaster this may be difficult. Hence emergency measures have been developed. Special bathing units to deal

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with large numbers of people rapidly have been used by armies and refugee organizations. However, even simpler control is now possible by blowing insecticidal powders (D.D.T. and others) under human clothing and on to bedding.

Head lice are similarly eliminated by simple measures of body cleanliness, hair cutting and washing, and the lice may be quickly dealt with by modern insecticidal lotions and oils.

BED-BUGS

Unpleasant though bed-bugs are in feeding on humans, they have not been proved to carry disease. The bed-bug (see Fig. 18) is a tough insect harbouring usually in poor premises in the rooms and furniture of its human host. The eggs are laid in cracks of floors, walls or furniture, where the adults also live. At night, or when the human occupant is quiet and accessible these insects emerge to feed on his blood. Its hardiness is shown in the difficulties of eradicating

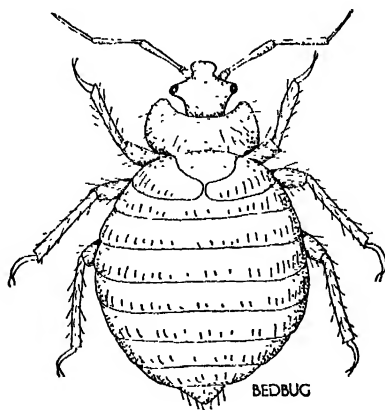


FIG. 18.

it from infested premises as well as in its capacity to survive for long periods without food.

Once again the newer, longer-lasting insecticides have much simplified the elimination of bugs from infested premises. D.D.T.

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sprays are used, with special attention being given to all crevices in the floors and walls of rooms and in furniture. Usually the process has to be repeated to clear the place of all bugs and their progeny.

Previously, the only certain method of success against bug-ridden rooms and houses was cyanide fumigation. Its dangers made it a method for use by experts only and under careful control.

OTHER INSECT PESTS

In temperate lands, insects of medical and health importance include a *mite* (Sarcoptes) which causes the awkward skin condition of scabies. This is a disease with lesions mostly in skin folds and between fingers and toes where the minute mites burrow into the skin.

One species of *spider*, known popularly as the black widow spider, has a dangerous bite. Its poison may even be fatal to some specially susceptible individuals.

Ticks are serious to health in the harm they cause to cattle by spreading disease. This results in much agricultural loss. In warmer climates some types of relapsing fever and typhus are spread by certain species of ticks.

The *tsetse-fly* is an important vector of the human disease, trypanosomiasis (sleeping sickness).

Finally, all those insects which cause immense losses of food in agriculture and those that destroy materials (clothing, etc.) in warehouses are of concern to health.

Chapter 11

The Environment and Health

HOUSING

In an earlier chapter the general features of climate and the regions of the world were simply described. In the broadest sense the nature of man's environment is determined by the local climate and topography of sea, mountains, plains or swamps. The farmer, living in a countryside which has a pleasant climate and is free of endemic disease, has a healthy physical environment. On the other hand a dock labourer in a tropical port suffers an unhealthy environment.

It is not such general environmental circumstances which are discussed here, but the more immediate surroundings and conditions in which man lives and works. This means the state of his house, his community, his work-place, and his nearby parks and recreational surroundings.

To follow man through history in his attempts to satisfy his needs leads to understanding the purposes of his present method of living. As a wandering hunter primitive man was forced to protect himself against the physical danger threatened by his human enemies and wild animals, and the discomfort and even hazard of the weather and climate. The cave was a natural abode for these purposes. There he was less vulnerable and could find some warmth and dryness.

Man as a cave-dweller occupied many parts of the world for generations. Around his caves he accumulated mountains of refuse, 'middens', which anthropologists now excavate in studying man's pre-history. Thus early man was troubled by the nuisances he himself created in his environment.

The next phase in evolution took place when man gathered in

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groups of families on the edge of waterways where they fished, or in river valleys in which they grew corn. He was then driven to make his own dwellings. Huts of grass, boughs of trees, mud bricks and stone appeared. Such groups, as time passed, became larger and more permanent and the dwellings more solid in structure. The hamlet led on to the village, the town, and finally the vast, modern, complex city.

THE ESSENTIALS OF HEALTHY HOUSING

Today the essentials still include the basic needs of primitive man to which has been added the requirements of the modern age. The habitation has to give man and his family protection and privacy against human intrusion, as well as against uncomfortable or even harmful weather. Possessions have to be safeguarded against theft by man, or destruction by pests. Transport and communication to and from house and work-place are more important than they were for early man.

The evolution of city life and that of industry, and the advancement of man's interest and culture have further complicated the problems of environment and health. Today, therefore, man demands much more in seeking a place in which to live and work.

In his house the essentials for healthy living are:

Separate rooms for sleeping, eating, cooking and general living purposes

Rooms of adequate size

Good construction and sound materials

Proper cross-ventilation

Adequate natural lighting by windows and doors

Pure running water piped into the house for cooking and washing

Means to dispose of garbage conveniently and harmlessly

A sanitary system to dispose of human excreta and wastes

A sound dry soil for the site, protected from dampness

Site with access to public roads, and away from industrial and commercial zones

Freedom from such nuisances as smoke, industrial effluents or gases.

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In 1949 the Central Housing Advisory Committee in Britain made the following recommendations: The dwelling must:

- (1) be in all respects dry
- (2) be in a good state of repair
- (3) have each room properly lighted and ventilated
- (4) have an adequate supply of wholesome water laid on for all purposes inside the dwelling
- (5) be provided with efficient and adequate means of supplying hot water for domestic purposes
- (6) have an internal or otherwise readily accessible water-closet
- (7) have a fixed bath preferably in a separate room
- (8) be provided with a sink or sinks and with suitable arrangements for the disposal of waste water.
- (9) be provided with facilities for domestic washing, including a copper (laundry boiler), preferably in a separate room
- (10) have a proper drainage system
- (11) be provided with adequate points for artificial lighting in each room
- (12) be provided with adequate facilities for heating each habitable room
- (13) have satisfactory facilities for preparing and cooking food
- (14) have a well-ventilated larder or food store
- (15) have proper provision for the storage of fuel
- (16) have a satisfactorily surfaced path to out-buildings and convenient access from a street to the back door.

In looking at any house or flat one should consider whether it has the basic necessities and whether it is the right size for the family it houses. Another question which should be asked is whether the family can reasonably be expected to pay the rent or mortgage for the house without making undue inroads on money that is needed for food, clothing, etc.

COMMUNITY DWELLINGS OF TOWN AND CITY

The growth of populations and the dependence of industrial communities upon densely populated and developed areas have

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increased the difficulties of giving each family satisfactory housing. Individual houses with their own pieces of ground are an ideal now almost impossible to find because of cost and the problems of distributing public services of roads, power and water. Hence the rise of vast communal housing schemes in the form of flats.

Such mass housing does not eliminate the need for the essentials listed above, though the individual flat occupier cannot have his own plot or garden. But over and above the basic requirements there are other needs to be met in aiming at safety, health, and pleasant living. Safety from fire and insulation from noise are two important matters. Then parking of cars, the provision of recreation grounds and access to the shops are problems which differ in a city from those of a suburb of individual homes.

Mass habitation in flats is unavoidable in most densely populated and industrial countries. Millions of people are thereby given good housing. They are much better off than both the industrial labourers in earlier generations in the older countries, and the new workers in the younger countries where cities and industries are growing too rapidly.

Bad mass housing consisted in the past of the long lines of ugly, damp, tenement houses and back-to-back dwellings, poorly lit and ventilated. Such homes were dirty and badly crowded, they rarely had separate water or sewerage systems and rapidly became slums. In the modern cities of the developed countries such degrading communities are being eliminated, though the cost to the local or national authorities is very heavy. However, new problems with health and social features are arising, even though the purely physical requirements may be fully satisfactory.

The maintenance of large blocks of flats, housing lower economic groups, is expensive and troublesome. Many families have little respect for property, and damage and destruction of fittings and even walls are done by them. Standards of cleanliness are low, so even new buildings rapidly become dilapidated. The housing authorities have to persuade, teach, and even force occupiers to safeguard property, and co-operate in keeping the premises clean and attractive. Continuous health and social education is called for, reinforced, where necessary, by inspection and penalties.

The Environment and Health

The social problems of large housing estates composed of blocks of flats are serious. Space for children and young people is particularly difficult to provide conveniently and cheaply. In countries with pleasant, equable climates, playgrounds, sports areas and even small parks meet the call for outdoor life. But even these must have constant supervision to prevent trouble from their users, and damage of their equipment and arrangements. It is the provision of indoor amenities, play-rooms, sports halls and social clubs, which is more difficult mainly because of the expense of building and maintenance. Consequently the congregation of large numbers of teenagers in such mass housing communities raises questions as to the use of leisure and the avoidance of gang behaviour leading on to juvenile delinquency. No health or nursing officer concerned therefore in the care of such large housing groups can neglect concern in their sociological aspects. It is here that many truly medical and health problems—mental health, physical fitness, alcoholism, and even drug addiction have some of their origin.

A progressive community will ensure that the thousands of inhabitants living somewhat impersonally and monotonously in mass housing schemes are well supplied with schools, clinics, parks, recreation grounds, and community libraries and clubs.

SHACK TOWNS

Today the rapid growth of large towns and cities, the large increase in population, and the rush of people from country to town are the cause of ugly and even dangerous housing conditions in many parts of the world. The health, social and even political hazards are frightening.

Towns and cities already growing too fast to secure good housing and proper supervision are being invaded by thousands of poor country people. The lure of employment and the attractions of city life have drawn these masses away from the depressed countryside and the poor farms. But the places into which they swarm cannot give them enough housing at rates which they can pay. Therefore the world today has come to have no uglier sights nor more awkward social and health conditions than those found in the large shack

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towns on the outskirts of so many cities in most continents. These improvised towns have spread without design or control in a hideous jumble of huts and shacks made out of sacking, old tin, pieces of wood and even cardboard.

These shack towns have nothing: no roads, no water supply, no garbage removal, no lighting, no drainage, no excreta disposal, no schools and no clinics. They are squalid, dirty, odorous and a threat to public safety and health. Tragically the countries in which this is happening are themselves often unstable politically and economically. In such shack communities, seemingly without hope of betterment, there is thus discontent, political unrest, unemployment and no education. There are mountains of refuse and all the setting for epidemics of communicable disease and malnutrition.

SLUM AREAS

In most towns and cities of the world there are slums, even if many are fortunate enough to have escaped the menace of shack townships. In slums and in other communities with poor housing, whether urban or rural, there will be various defects.

- (1) *Overcrowding*. This is general in the poorer areas of nearly all cities and towns, and occurs too in the hamlets of most poor agricultural countries. Strict legal definitions of overcrowding are difficult to fix on a scientific basis, such as minimum size of bedroom, minimum number and types of rooms, or the rate of air-change in a room. Some practices have come to be recognized as sound for health and social purposes, and in some countries these have been framed in local authority by-laws or national health regulations.

It is generally accepted that there should be enough rooms for (i) any two persons of different sex, who are over 10 years old and are not husband and wife, to sleep separately; (ii) a separate kitchen; (iii) a separate living room.

The minimum measurements of a bedroom are also usually accepted as 10 ft. x 9 ft. x 9 ft. However, many housing authorities are unwilling to agree to a ceiling height below 10ft.

- (2) *Bad construction*. This is naturally common in poorer housing.

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It means a bad environment for health in that such housing is usually badly designed and so the rooms are ill-lit and ventilated. The house may leak and be damp, and in cold countries be impossible to warm cheaply. These are the gross defects. Such bad features as ugliness and inconvenient or even unpleasant arrangements and relationships of rooms are common. A bedroom or a lavatory opens off a kitchen, or a kitchen is approached through a bedroom. Another dangerous defect often found in old houses is that rooms on the same floor are at different levels. This necessitates steps at awkward places and is often the cause of a fall especially among the elderly. One Victorian house at Wimbledon which had three storeys had rooms on eighteen different levels.

Bad construction means premature need for repair, and as repairs may be beyond the means of owners or tenants the buildings decay, become slums, and a whole community loses its self-respect and finds it more difficult to lead a healthy life.

- (3) *Lack of services.* Two services are essential for individual and communal health. They are the water supply and the removal of waste. It is easier for both to be given efficiently in the larger communities of towns and cities. The farm house and country hamlet are frequently without safe water and lack satisfactory means of disposing of human excreta and kitchen garbage. However, in a large community where the water supply becomes polluted the consequences in terms of epidemics are much more serious than in a small community.

It is in urban slums that both services are lacking in quantity and efficiency. Many houses or flats will not have water piped for each family, and many people will have the use of only one neglected, dirty lavatory.

Other services are also generally unsatisfactory. Garbage receptacles are insufficient and are not cleared often enough. Streets are neglected so are in disrepair and littered with refuse. Fire hydrants are too few and far between. Parks, recreation grounds, clinics, schools, hospitals, libraries—all the amenities may be in scarce supply and poor.

- (4) *Lack of communal supervision.* Widely scattered, poor country

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dwelling or large city slums have similar problems of health and medical services. It is expensive and difficult to plan and supervise their needs. Health visitors, health inspectors, district nurses, building inspectors, and medical and health officers are never numerous enough to visit regularly and give as much care as they would like for problems they face. Then the financial obstacles to undertaking the necessary reforms result in a depressing and unending campaign of 'patch and repair'. Instead of the preventive measures of adequate and good housing, sufficient water supplies and the removal of waste, and continuous health and medical care which such countries need, all that the health service is usually able to provide is rudimentary supervision and a succession of emergency arrangements when there is a typhoid, dysentery, or diphtheria outbreak, or tuberculosis becomes too prominent.

SOME RURAL ENVIRONMENTAL PROBLEMS

Housing and environmental services for country people pose some difficult health and social problems even in advanced countries. Clearly the wealthy farmer or country estate owner lives in good surroundings. His house is well designed, well-constructed, has sufficient rooms, has proper kitchens, is well supplied with power and light systems and purified water, and has its own efficient arrangements for disposing of excreta, waste water and garbage. Finally it is invariably pleasantly sited in ample grounds connected by road and telephone with local towns from which an urgent call for help is conveniently answered.

The lot of most country dwellers is less easy, and in most of the world it is hard and unhealthy. By good fortune a warm climate, open-air life and country freedom are compensations and protection against much ill health in many regions.

A poor, rural community may suffer from any of the following disadvantages:

- (1) *Isolation.* Roads are unpaved and undrained; communications are poor. Supplies of food where not locally grown, of

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agricultural fertilizers, of construction materials, of household goods, of drugs are not easily obtained and are expensive. Transport to shops and schools is difficult, and any social life is limited. Obtaining help, especially skilled medical or nursing assistance, is laborious.

- (2) *Housing.* The poverty of the community and the individual farmer owner or tenant mean that most country housing is badly designed. It is frequently sited in damp or unhealthy surroundings, constructed of poor materials which decay rapidly.
- (3) *Services.* There is no power or electrical supply. Cooking is done on old-fashioned stoves with poor fuel. Water comes from a doubtful local well, or is drawn from communal water-holes or rivers certainly contaminated. Latrines, if they exist at all, are badly made and inefficient. Frequently they are a direct means of contaminating the local well or other water supply. Garbage is mostly thrown carelessly around dwellings to add to unsightly houses and hamlets and their attraction for pests.

General social services may be unknown or sparse. Schools may be few and primitive. Clinics are rare. Libraries are luxuries. Even roads and police protection are limited. Nurses, doctors and dentists are so few that their aid is only sought in emergency. District visiting may be beyond their power.

TOWN AND COUNTRY PLANNING

Houses and flats may have the basic essentials yet the inhabitants be denied much. Towns and cities may grow by extending suburbs of satisfactory houses and yet destroy the countryside. Roads and railways, power lines and irrigation canals, and many other components of a growing nation may advance the economy but reduce the beauty and other natural assets of the country.

Realization of the fuller life and its needs has been one of the more recent influences enlarging the responsibilities of the individual citizen and the community. A good habitation, properly

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constructed and suitably supplied and serviced does not satisfy all the desires or even essentials of man and his family. Man has social privileges and responsibilities. He needs to give his children opportunities to learn, play, and grow up successfully. He needs outlets for recreation, sport and social life. He needs occasions for entertainment and outdoor life. He needs the means to enjoy natural beauty and to avoid ugliness.

Especially by his modern, rapidly growing towns, spreading factories and industrial regions, man is damaging the natural countryside, marring its beauty and making it unpleasant with soil erosion or industrial effluent and waste. Smoke and smog are affecting vegetation and animal life. To stop such harm is the purpose of town, country and regional planning. This attempts too to prevent land being excessively sub-divided for building regardless of appearances. It prescribes the type and number of buildings, and aims at the preservation of open spaces and natural resources of trees and countryside. It controls the amount and place of industrial and commercial areas, and prescribes the inclusion of schools, hospitals, public buildings, parks and 'green belts'. It assists easy movement and transport by influencing the relationship of communities to roads, railways and airports, and conversely helps to give housing zones quietness and freedom from the dangers of fast through traffic.

In its more advanced expression such planning does much to help a people to enjoy the beauty and tradition of their country. It sets aside regions too where plant and animal life may enjoy freedom and be enjoyed by the community.

In providing good housing and a pleasant and beautiful environment and countryside a people does much for its physical and mental health. Good housing reduces such conditions as infantile diarrhoea, tuberculosis and respiratory infections. Good housing in a fair and pleasant town surrounded by unspoiled countryside stimulates better physical well-being and nutrition and a fuller mental and social life.

Chapter 12

Water Supplies

There is no more obvious health need than water. Human, animal and plant life is impossible without it. Man may survive many days even weeks without food but he soon dies without water. But vital though this is, water means much more to man. It is also the single basic ingredient of the whole of his economic and social life.

Water has much significance for medical and health workers. Not only is it necessary for survival but the whole of man's metabolism and physiology demands a proper, regular intake of water. But water may be a carrier of poisons and infections against which protection is needed.

Man also needs water to keep himself, his belongings and his surroundings clean and sanitary. Much water, flowing continuously, is further required to carry human excreta and noxious wastes away in water-borne sewerage systems. The basis of fire-fighting too in modern large communities is a plentiful water supply piped everywhere under pressure. Then, as man seeks the fuller life of natural beauty, recreation and relaxation in his social community he again relies on water to give him parks, 'green belts', avenues of trees and grass along his roads, recreation and sports fields and nature reserves for plants and animals. Even more fundamental is human dependence upon large volumes of clean water for factories, agricultural irrigation, and for power stations.

Many countries in the drier parts of the world are becoming much concerned with the danger that even the use of all their water will not be sufficient to meet the growth of population or the demands of

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expanding industry. They are searching, therefore, for simpler and cheaper means of making fresh water from brackish or even sea water. Not only in such lands but in some of those with a more plentiful rainfall supply and with a dense population the avoidance of waste is now necessary. Then too the consumption of water by large cities is so great that only by bringing it expensively from vast distances is enough obtained.

From a purely health and medical point of view there are two requirements in connection with water. Firstly there is the necessary quantity, which must be enough for drinking, cooking, personal bathing, laundry and general house cleansing. To this basic quantity in towns and cities must be added the volume required for water-borne sewerage and street cleansing.

Secondly there is the requirement of quality. Water for humans must be free of harmful elements. The deliberate addition of fluorides to a water supply is a relatively novel procedure which has been adopted in several American and European systems. The purpose is to aid the development of sound hard teeth. However, this process has been opposed by some communities which claim to be unsatisfied that it has no hazards.

THE PROVISION OF WATER IN A COMMUNITY

In the country, water is drawn from a well or from a lake or river. Hence the protection of a rural community from water hazards, or even the provision of adequate supplies is difficult. Health supervisors have the laborious task of surveying every farm and hamlet and its water supply and giving individual suggestions on the defects and methods of dealing with them. In the simplest cases there may be no practical possibility beyond an appeal to householders to boil all water used for drinking, cooking and washing in the kitchen. Single units for storing and purifying water using chemicals are too expensive for any ordinary country household.

In the case of wells, the health inspector is able to point out dangers from polluted surface water finding its way in, or any obvious potential source of contamination in a nearby cesspit or garbage heap. He also is able to recommend that a well should be:

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- (1) lined to prevent pollution occurring through superficial layers of the soil
- (2) fitted with a tight, impervious cover
- (3) equipped with a motor or hand pump.

Wells reaching into deep, water-bearing rocks are naturally safer than those drawing water from superficial porous soils.

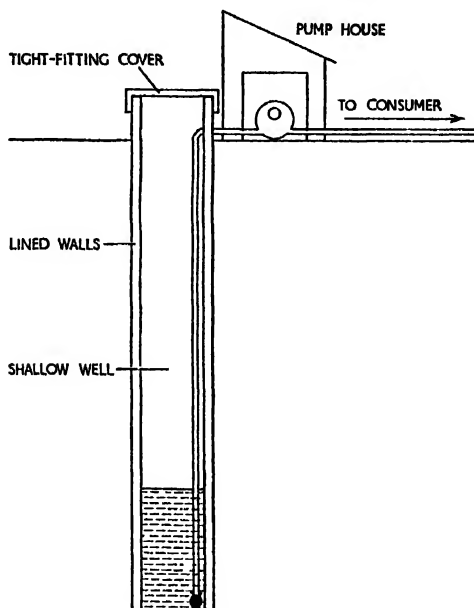


FIG. 19. Diagram of a shallow well with lined walls, tight cover and pump

All river and lake water almost everywhere today must be considered unsafe for direct human use. Picnic and camping parties, farmers and others who may use such water should rely on boiling as the simplest and safest method of purifying it. Labour forces and troops, equipped with water purification apparatus using various chemicals, are able to clear and chlorinate large supplies drawn from such sources.

Water Supplies

Even in some rural areas, but essentially in all urban areas, the supply of water is increasingly a specialized engineering work. The details of such large community systems need not concern nursing and medical students. A few simple principles and facts, however, should be known.

Water in such systems is drawn from large, continuously flowing rivers and large lakes, or from artificial reservoirs protected from gross contamination by human or industrial wastes. In some areas radioactive wastes in a remote contingency could become a potential contaminant.

Enough water should be stored to allow all householders to obtain their own piped supplies, on an estimation of at least 50 gallons per person per day.

Water from sources of this kind is always suspect. Indeed, in the case of large rivers contamination of all kinds is gross, and major purification works are necessary to deal with the various impurities, which range from decaying vegetation, mineral salts, heavy silt, and the newer detergent foams, to animal and human wastes. Chemists and water engineers have to examine the water and therefrom decide on a suitable purification system. This will include such apparatus and procedures as:

- (1) screens to remove large matter and particles
- (2) large sedimentation tanks which slow down the flow of water to allow settling to take place, a process usually assisted by the addition of alum
- (3) filters of various kinds in most of which graded layers of sand are used: the water usually then emerges clear in appearance
- (4) treatment tanks in which the actual process of purification takes place, usually dependent upon chlorine: this is the water chlorination process, the essential element to make water safe for drinking.

Such works and processes require constant checks and supervision to maintain their efficiency. Samples of water are regularly examined chemically and bacteriologically for this purpose. The so-called B.coli index is one test which is accepted as a guide to the presence of faecal or human excretal contamination. A certain type

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of *Bacillus coli* is peculiar to the intestine so that its detection in large numbers in a water sample is suggestive of faecal contamination in serious degree.

From the treatment works, the water is distributed by pipe to individual homes and buildings, either by gravity alone or assisted by pumps, (see Fig. 20). In modern piped systems in or outside buildings, lead is no longer used, so lead poisoning is not now a health hazard. Another earlier defect is also now unlikely to occur. This is the occurrence of poor piping with loose joints or cracks,

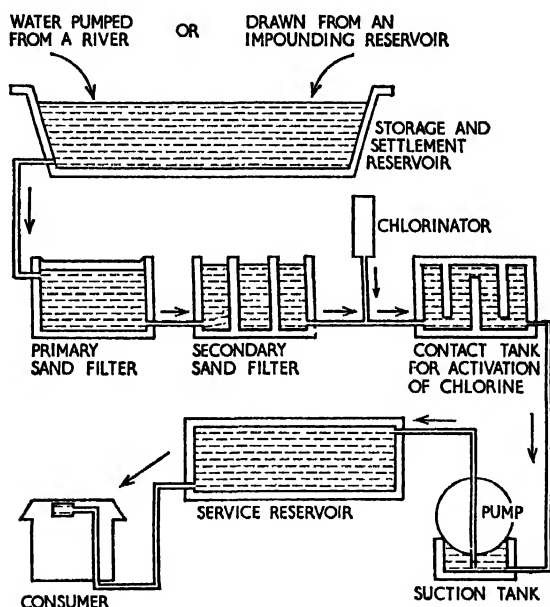


FIG. 20. Diagram showing how water is pumped from a river, stored and purified before it finally reaches the consumer in a house

lying in contact with sewerage pipes which were similarly unsatisfactory. Sewage then entered the water supply, a cause of several epidemics of typhoid and dysentery in that area.

Ideally for health and social purposes every household should

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have its water supply piped into kitchen and bathroom, and be equipped with an associated hot water system.

SPECIAL SUPPLIES

Health and medical advice is particularly sought when water has to be supplied to special groups or in special circumstances. Examples are refugees, holiday campers, labourers on construction works in the country, large quarantine stations, troops in the field, or urban populations suffering a failure in supplies.

The following procedures and principles should be followed:

- (1) A strict control and supervision must be arranged, with clear instructions about the use and protection of the water. This requires too a discipline for the whole community, otherwise water will be recklessly used and thus wasted, or the source of the water or the apparatus for its storage and distribution, such as tanks and taps, will be damaged. Water then becomes easily contaminated.
- (2) The proposed source—river, lake, spring, or well—must be carefully surveyed by health and engineer inspectors. This gives estimates of its quantity and its nature. From such an inspection the type of collection, purification and distribution may be arranged.
- (3) The source must be protected so that no indiscriminate or unauthorized drawing of water takes place, and pollution is prevented, (see Fig. 21). This usually requires the area being put 'out of bounds', and, if necessary, put under guard.
- (4) The engineers have the responsibility of devising methods of collecting the water, which may mean pumping it into tanks, clearing it of gross matter, and finally, purification. Fortunately there are relatively simple methods today of adding chlorine-producing chemicals to tanks of water for this purpose, where improvised arrangements are necessary for large groups. Where advance planning is possible, and funds are provided there is a variety of water treatment trucks with pumps, tanks, filters and chlorine treatment apparatus.

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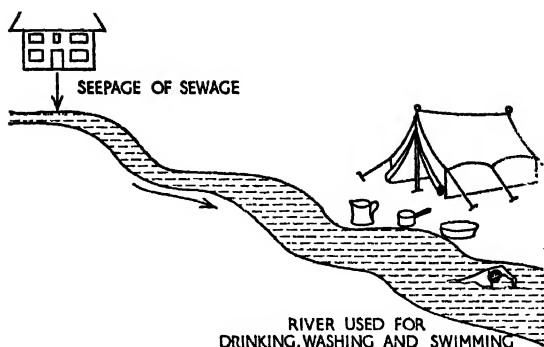


FIG. 21. Drawing showing the seepage of sewage into a river used for drinking, washing and swimming

Where emergency arrangements are required, storage of water for some hours in tanks or other containers allows a high proportion of suspected debris and matter to settle out. Such water can be further cleared by improvised strainers made of clean blankets or sacks, and finally used for drinking, and kitchen purposes after boiling, if no field chlorination is available.

HAZARDS OF WATER SUPPLIES

These fall into two groups—chemical and biological, though the atomic age is adding radioactivity as a potential new risk.

Chemical risks. Towns and cities with modern supplies sometimes face expensive problems in dealing with chemical problems in the rivers and lakes from which they draw their supplies. A common one is the occurrence of salts causing water hardness. This is admittedly not directly a health hazard but becomes so in adding to the cost of a water supply, the damage it does to water systems, and the increased difficulties of washing and laundering.

Lead poisoning, previously a health problem has practically disappeared with the elimination of lead from modern pipes and plumbing.

The occurrence of various salts in some waters produces enteritis.

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Local inhabitants develop some tolerance, but newcomers may suffer severely. This is especially so in some arid regions of the world where most wells draw on brackish, underground sources.

Modern detergents, used more and more lavishly in the average home, are adding to the problems of the water engineer and chemist. Whole river sections and sewerage works are covered by enormous masses of detergent foam. This adds to the difficulty of obtaining satisfactory water supplies, and interferes with the various processes in a sewage treatment works.

Biological risks. The main concern is with those micro-organisms which cause human disease. Many such agents may survive for long periods in well, spring or surface waters.

Bacteria are the more serious biological hazards. They are responsible for typhoid, dysentery, and, in tropical countries, cholera. In the past, enormous epidemics of these occurred in most countries. Even after piped, purified supplies became general, outbreaks occurred, and many still do. Any failure in the purification system may let through typhoid or dysenteric organisms into the water supply.

There are distinctive features which suggest a water-borne epidemic. Many cases occur rapidly at about the same time. The great majority are related to a particular water supply, and incidence of sickness disappears as soon as the water defect is corrected.

Though large, water-borne epidemics of typhoid and dysentery are now almost unknown in modern communities, outbreaks are still all too common in smaller towns even in many advanced countries. Such water-borne disease is, unfortunately, endemic in many of the less developed regions. Indeed it is a type of sanitary index. Communities with good water supplies and sewerage systems eliminate these conditions, others reveal their sanitary backwardness by their continuing existence.

Water may also spread disease caused by such parasites as entamoebae and helminth worms. In warm and tropical countries water is the means by which the cycle of schistosomiasis, from man to snail to man, takes place.

Chapter 13

Disposal of Wastes

A single family living alone in the country must make some effort to dispose of the various wastes it produces. The larger the human group the greater the effort required for this purpose. In the case of large cities and industrial communities, the services for the removal and disposal of wastes are amongst the most costly and important undertaken by local and regional authorities. Hence the importance of the subject for all concerned in the proper functioning and safety of the human community from the smallest to the largest.

TYPES OF WASTES

HOME AND GARDEN

In yards and gardens waste materials are continually gathering—dead leaves, grass cuttings, fallen branches, waste paper, old wire, tins, etc.

From the house comes waste water from the bathroom, laundry and kitchen. Food and cooking debris and waste are produced in large quantities daily in all homes. The kitchen and pantry too are the source of the increasing number of food containers and wrappings discarded as waste in the form of cardboard, plastic and tin containers.

Then finally there are the disposal problems associated with human excreta, i.e. faeces and urine.

Disposal of Wastes

STREET AND PUBLIC PLACES

Any city, town or even village today cannot avoid the onus of dealing with the surprisingly large quantities of varied materials which find their way into or on to streets, pavements, parks, recreation grounds, river banks or vacant areas. Failure to do so could soon mean an intolerable accumulation of water, paper, tree and grass debris, cans, tins, animal droppings and even their corpses, soot, and food and garbage generally. In addition the wastes of building construction and excavation are significant in any rapidly growing or changing communities.

COMMERCIAL AND INDUSTRIAL ZONES

Much of the debris which occurs in shopping and trading areas is no different from the usual wastes found in public streets and places. However, the disposal of restaurant and café kitchen wastes, empty cardboard, wood and metal containers, waste paper and garage washings are more awkward.

Industrial zones produce most difficult problems. Workshops and factories mean large quantities of many different kinds of dry and fluid wastes—smoke, soot, water and corrosive fluids, oils, fats, ash, rubble, slag, chemical and similar heavy waste by-products.

Ships in ports are a special problem. There are the usual kitchen, bathroom and human excretal products, but especially troublesome are the engine-room discharges of ash, slag and oil.

The most recent and difficult of all waste problems for any modern authority is that of the wastes from nuclear power installations.

MISCELLANEOUS TYPES

Hospitals, particularly for infectious diseases, pose special problems in disposing of wastes. Then in such public institutions as schools, barracks, camps, and hotels quantity makes for difficulties.

Abattoirs with their offal, hides, blood and animal wastes, and noxious or offensive trade factories, such as soap-making, leather works, fish-meal manufacture, create yet other difficulties.

Disposal of Wastes

THE IMPORTANCE OF PROPER DISPOSAL

Most reasons for the full and proper disposal of wastes in a community are obvious.

First there is the need for orderliness and cleanliness in the home, work-place and surroundings. But for a public garbage and waste removal service there are other complications. The steady accumulation of leaves, paper and other dry materials becomes obstructive and may even cause a fire. Storm waters, unless drained away can destroy streets, flood houses and do much other serious public and private damage.

Many house and institutional wastes such as food remains, stable washings, laundry water, factory smoke, slag heaps and industrial effluents cause unpleasant public nuisance. Unsightliness, offensive odour, and physical damage to buildings and streets may follow if nuisances are not properly controlled. Another hazard associated all too frequently with garbage heaps, sewage works, or any uncontrolled refuse collections is the attraction they have for pests such as flies and rodents, also dogs and other animals, and pigs in rural areas. This feature has a definite medical significance in the part played by flies in spreading excremental disease, rodents in spreading plague in some countries, and dogs and pigs in spreading tapeworms and other helminthic disease.

Fire is a hazard in any badly supervised accumulation of refuse and uncontrolled burning in refuse dumps is a too frequent sight on the outskirts of many cities in some countries.

The disposal of large quantities of waste waters from bathroom, kitchen and laundry poses technical difficulties because of soap and detergents. Failure to remove these in treating the waste water is the cause of serious trouble in rivers and lakes, the waters of which become spoiled and unpleasant. Other elements which are difficult to remove from waste waters are fat and grease. These are amongst the commonest causes of blocked waste pipes and interference with the action of septic tanks or small sewage works. Such greasy and fatty waste waters polluting open drains or streams also cause offensive, stagnant scum.

Disposal of Wastes

Human excreta is the most important factor to consider medically in the safe disposal of wastes. Apart from the nuisance caused by its presence, it may be the source of such disease as the typhoid fevers, food poisoning and dysenteries, probably such virus conditions as poliomyelitis, protozoal conditions including amoebic dysentery, and worm infections.

In the chapters on communicable diseases, more information is given about the serious ill health caused by excremental disease. Large epidemics have been traced to human excrement finding its way into wells, rivers and other sources of public supplies. Such pollution may arise in many ways. Excreta on the surface is washed by rain or storm water into wells or rivers. The pit latrine, (see Fig. 22, and p. 161) frequently found in country districts, if badly placed may easily pollute underground water from which wells draw supplies for human use. Faulty or broken sewer pipes may result in their contents either contaminating underground water supplies or adjacent water pipes which are also faulty.

The various types of sewage systems, from the simple septic tank for a single household to the large works for a city, may be the source of excremental micro-organisms entering rivers, lakes or underground supplies. Even the discharge of sewage effluents into the sea can be the cause of nuisance to seaside resorts or of disease through infecting oyster beds.

The modern and special case of nuclear power wastes is of direct health importance. If the cooling waters of such power stations or factories, or their by-products and wastes were not completely and safely controlled and removed, radioactive substances could do enormous damage if spread by air, water or direct human contact. All life—human, animal and plant—is sensitive to both immediate and remote damage if exposed to radioactive substances.

The whole field of industrial by-products and wastes, such as smoke, gases, fluids, oils, slag and ash are most deleterious to whole neighbourhoods on land and sea. However, the subject is one of special industrial technology which will be but briefly referred to again in the chapter on occupational and industrial health.

Finally, a sound administration of waste disposal is economically worthwhile. The collection and separation of wastes allows the

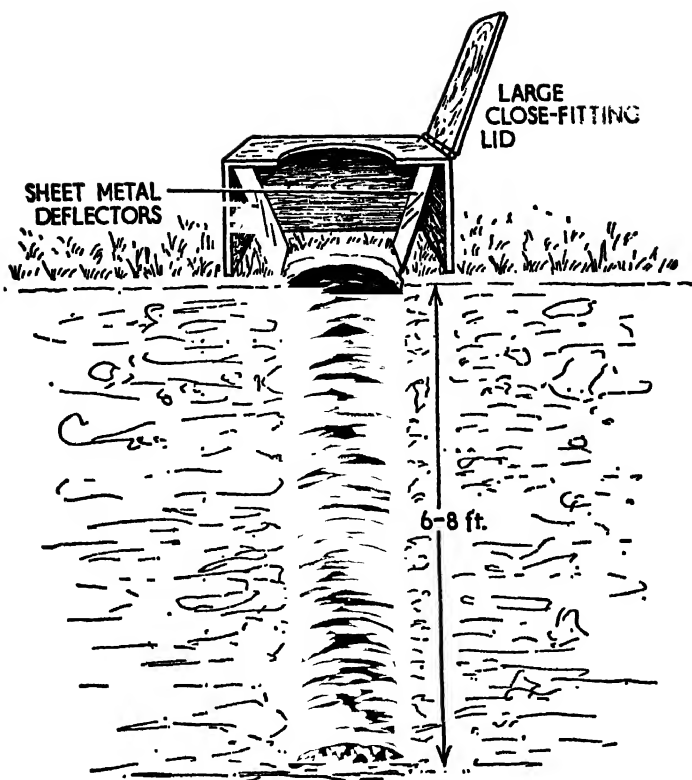


FIG. 22. A pit latrine

whole system to be operated more efficiently, and even with advantage in the salvage and sale of some materials.

METHODS OF WASTE DISPOSAL

RURAL SYSTEMS

The health or medical adviser finds many awkward problems concerning waste disposal on farms, country holiday resorts,

Disposal of Wastes

caravan sites or camping areas. Proper equipment or adequate trained staff to deal with the refuse are not always easily or economically to be found.

Dry refuse. This includes paper, leaves, discarded containers, (glass, wood, cardboard, metal or plastic), road and garden sweepings, or junk generally. It should not be dumped carelessly or indiscriminately. Firstly it needs sorting by the householder into material which may be useful, and that which cannot be used and yet needs disposal, such as old metal, wood and paper.

Useful dry refuse consisting of vegetable matter such as leaves and garden wastes can be added to compost heaps or pits. These are collections of material suitable for the organic processes of decay into 'humus' for use in gardens and in agriculture. Burning such refuse may be convenient and is certainly safe, but it destroys valuable 'soil food'. It frequently results in another problem because domestic and garden fires as well as industrial furnaces add to smoke and smog in nearly all industrial regions today. Their effects are harmful. Buildings are eroded and blackened; plant life is hampered; everything exposed including the contents of houses and buildings and also clothing is fouled. Human health is undermined, particularly by respiratory conditions such as bronchitis. It is, therefore, wise to burn refuse only in remote country districts.

Hard items of dry refuse, i.e. metal and wooden containers and junk, should be collected and either dumped methodically on the property if large enough and covered with earth in suitable depressions such as quarries, or removed by a communal refuse removal service for disposal in controlled and supervised dumps.

Organic wastes from the kitchen or farmyard, such as food debris, manure and yard sweepings are valuable additions to compost pits or heaps. However, this organic waste demands careful supervision for it is in such matter that the domestic fly finds ideal breeding places. It is, therefore, essential to cover such material immediately with a layer of earth, and to watch for the appearance of fly larvae. Insecticide sprays must then be used to prevent the emergence of flies.

Kitchen refuse, from farm or similar country places needs careful placing in strong, metal-lidded garbage bins which should be

Disposal of Wastes

emptied daily, either into controlled compost areas or removal vehicles.

Waste waters from kitchen or bath should not be discharged on the surface or into streams unless these are large and flow strongly. Water coming from nearby streams into which wastes have been discharged should not be used for human consumption. The best method in country areas is to discharge such waste waters through grease-traps into so-called 'French-drains' or septic tanks. Grease-traps are essential to prevent premature clogging and 'breakdown' of the drains and tanks.

Human excreta as the greatest danger to human health poses difficulties in country communities. On isolated farms or in similar small, country communities, the pit latrine has a place, provided it is sited to avoid the pollution of any water-supply and is properly constructed. The pit should be at least six feet deep and covered with an impervious platform on which is placed the sanitary seat. This in turn should be properly designed to prevent soiling of its sides, and equipped with a cover to keep flies out.

The casual burying of human excreta under an inch or two of loose soil is inefficient as flies will deposit their eggs in it.

As with all arrangements to dispose of all kinds of refuse in country farms, camps, etc., the most thorough and continuous control and discipline are required in dealing with excreta. Latrines and disposal sites should be inspected daily.

TOWN AND CITY SYSTEMS

Increasingly the disposal of all types of wastes in modern cities and towns is a specialist service, but it is a service which is only too often inefficient. A test of a well-administered and developed country is found in the nature of its sanitary services. The good service is properly staffed and equipped and is subject to regular supervision by appropriate health and engineer experts.

Dry refuse is collected in metal or plastic receptacles properly designed in stoutness of structure and in possessing self-closing lids, (see Fig. 23) The refuse paper sack is also used. It has a fixed rubber lid and is suspended from an iron ring. The best service collects the

Disposal of Wastes

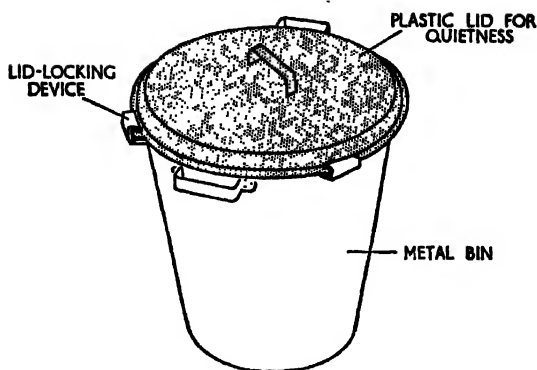


FIG. 23. A dustbin

refuse daily, either discharging the contents of the receptacles into special vehicles, (see Fig. 24), or removing the full receptacle and replacing it with an empty one. Some homes possess sink disposal units. Garbage is ground up so that it can be disposed of by the drain.

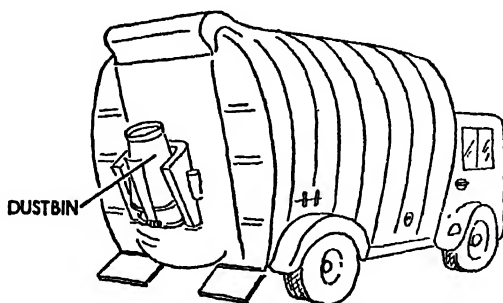


FIG. 24. A modern refuse collecting-van

The refuse dump especially demands a properly organized system under a responsible officer to avoid nuisance. A disused quarry or other depression is filled to a regular pattern with care taken to prevent paper blowing away, or rats, dogs, or pigs scavenging in the refuse.

Disposal of Wastes

Domestic water wastes. No town or city is acceptable now as efficient unless it possesses a full water-borne sewage system. Such a system receives all waste waters from kitchen, bathroom and laundry. The occupier of the house or other building then has only to ensure that the necessary baths, sinks, and other fixtures are connected to the city system.

Human excreta. Again the modern sewage system has largely removed the individual householder's responsibilities. Provided the various items of apparatus and the piping are maintained properly and cleared of any blockages, human wastes are removed immediately and innocuously. Bucket night-soil removal services are rarely justified. They are extremely difficult to keep free of nuisance as well as being costly.

WATER-BORNE SEWAGE

Each building is provided with water-closets, kitchen sinks, baths, hand-basins and laundry tubs. These all drain into the main sewer pipe of the property. This pipe has the necessary inspection and clearance traps and chambers, (see Fig. 25).

In many areas streets and surface waters are also drained into the sewage system. In others these waters, especially in flood times are removed separately. The main sewers are usually laid along streets to provide for easy access for inspection, clearance or repair through sewer manholes.

The main problem from the health point of view in the ultimate disposal of sewage is the prevention of disease and nuisance. The responsible medical or health officer has to be satisfied that the sewage works and the material and effluents that come out of it are not a danger to health or offensive to the local community. He must be sure that the supervision of all the sewage processes is constant and efficient but he need not be concerned with engineering problems. These are now complex depending upon the application of physical, biological and chemical principles and systems. There is therefore no call for the health or medical worker or nurse to study the detail of the design or procedure of sewage works. Nevertheless, a medical responsibility exists in approving of the conditions of the

Disposal of Wastes

disposal of the effluent which emerges after treatment of the sewage. In highly developed works the treatment is such that the effluent is so pure that it may be discharged directly without harm or offence into any river or lake or on to land. However, sewage works are a heavy financial burden in some communities, and in suitable cases it

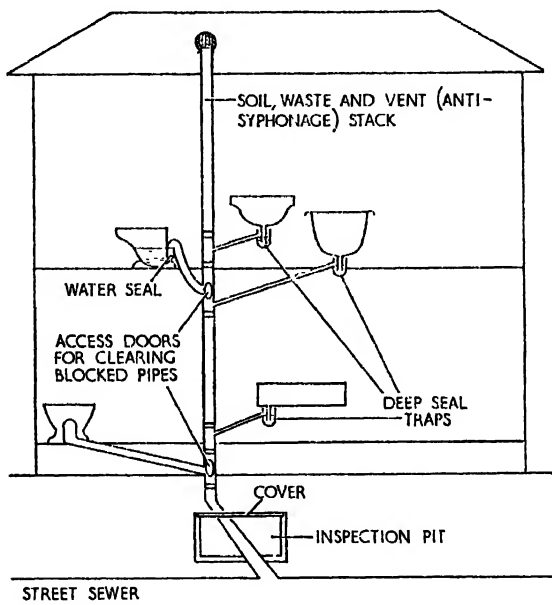


FIG. 25. Diagram showing how waste water in a house is disposed of

is permissible to allow the effluent to be less rigorously purified and its discharge allowed into waters or land where it is unlikely to be a danger. In some fortunate communities, usually small, sewage only partially cleared may be discharged by long pipes into the open sea. Dilution and mixing is adequate and takes place immediately, so avoiding trouble.

The processes which take place in a sewage works to render sewage harmless are:

Disposal of Wastes

- (1) Screening to remove gross physical hard particles
- (2) Sedimentation to allow settling and decomposition of organic masses. This may be assisted by such agents as alum
- (3) In large tanks, liquefaction produced by microbic action both aerobic (air), and non-aerobic organisms (bacteria)
- (4) Filtration which allows microbic action as well as filtering to take place
- (5) Aeration when air is blown through tanks in which the biological processes both microbic and biochemical occur
- (6) Purification by chemical means (chlorination) of the final effluent
- (7) Disposal of sludge and effluent on land or in water.

SPECIAL SYSTEMS

Hospital wastes from wards, operating rooms or the mortuary call for some special arrangements.

Human excreta, discharges, dressings and wastes generally from the more serious infectious disease cases such as smallpox, septic wounds and lesions, typhoid, cholera, plague, etc. need the most careful collection in special containers and destruction in incinerators or direct discharge into sewage systems by special arrangement with the responsible local authorities.

Human tissues and wound dressings from ward or operating theatre are most suitably disposed of by incineration.

Industrial wastes. These are an increasingly serious civic and health subject which will be referred to in the chapter on occupational and industrial medicine and health.

Chapter 14

Occupational Health and Industrial Medicine

The subjects occupational health and industrial medicine are not exactly the same although they overlap considerably.

OCCUPATIONAL HEALTH

Occupational health is concerned with all the factors affecting the health and well-being of people in the various occupations found in modern society. It is the concern of governmental and local authorities, employers and employees, architects and engineers, various specialists in some industries such as chemists, welfare officers, and not least doctors, nurses and health officers.

Today the efficiency and contentment of people in their occupation are known to be closely affected by their health. Hence the attention given to the fitness of the worker, the diseases from which he suffers, the condition of the places in which he works, the safety of the machines and processes he uses and the industrial hazards to which he is exposed.

MEDICAL EXAMINATION OF WORKERS

Pilots of passenger aircraft are medically examined regularly and this is but one well-known example of a practice followed by many modern industrialists and employers even in occupations where health is apparently not such an immediate and essential a requirement as it is for air pilots. Medical examination is, however, necessary in any community responsible for employees entering such

Occupational Health and Industrial Medicine

occupations as mining, public transport, and in many factories making or using chemicals. As well as the initial medical examination there is the increasing practice of repeated or follow-up medical examinations.

Medical examination on entry to employment ensures that only people who are physically and mentally fit are recruited. The later examinations ensure that any departure from that fitness is detected early. Such examinations are frequently very thorough. A full record is taken of the individual's health history, his physical condition, medical findings, including often X-ray pictures of the lungs, urine tests, descriptions of the eye and ear, and tests of muscular and nerve condition and reflexes.

For many occupations a medical examination is combined with the determination of the aptitude and indeed the general suitability of an individual for the proposed work. The selection of people for jobs and the right jobs for people is becoming surer every year as a means of avoiding bad workmanship and waste in industry, and frustration and even misery for workers wrongly used. The risk of having a colour-blind driver of a train is a dramatic example of the need to select suitable individuals for certain work. Similarly there is harm to industry and to the individual in asking a man of clumsy movements to handle fine instruments or tools. In an iron foundry, a small, somewhat timid person is unlikely to be either efficient or happy. Such rather crude examples show how account is taken in many occupations today of several factors in persons seeking employment. These include the past medical history, education and training, the physical and mental condition, and skills and aptitudes.

The particular requirements of many occupations are also becoming better known. In one, quickness of reaction is necessary, in another, accuracy, and in another, a placid nature.

The selection of workers according to the type of work they will do is to the advantage of all concerned. The individual has his health safeguarded. He is more likely to find satisfaction in his work. The management gets more contented workers, better, quicker work, fewer accidents, less waste through carelessness, and fewer difficulties over work conditions.

Occupational Health and Industrial Medicine

MEDICAL RECORDS

Medical and related records are an important part of occupational health programmes. The results of the various medical and other examinations have to be recorded. There must also be a health history of each worker complete with an account of his illnesses and injuries and of any change in his physical or mental state.

The study of such records is in the interests of both employer and employee. They show the general picture of health of the labour force as well as of accidents or diseases which may be a special hazard in a particular industry. They are therefore a guide to the success of methods of keeping the workers healthy and productive, and to the effectiveness of methods to protect them from injuries and industrial diseases.

Every nurse in industry should be conscientious in helping to keep the medical records complete and accurate. Even the number of slight illnesses or the occurrence of minor injuries is important. They may be warning signs of the beginning of serious disease, or of a job being unsuitable, or of proneness to accidents. Thus the nurse achieves more than the immediate treatment of ill health or injury by taking a direct interest in the medical and personal records of the people under her charge. Frequently it is she, rather than the industrial medical officer, who is able to learn the full story of each worker. She knows their problems, their hopes and fears and their family and social situations which so frequently affect their work. Medical records become most instructive when explained by this wider and more personal knowledge which the good nurse will acquire when working in an industry or factory.

RURAL OCCUPATIONAL HEALTH

Too often discussion of occupational health is limited to factories and industries in towns. Yet farming is but agricultural industry, and many other people live and work in the country. To help such workers is often difficult in that they are usually working as individuals or in small groups scattered over wide areas. Organized,

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efficient and economic health supervision or medical care is rarely possible for them. Frequently their work is long and arduous. Their homes are poor, and doctors and nurses few and far between. Such problems are typical of rural populations generally, and some reference is made to them in other chapters.

INDUSTRIALIZATION AND URBANIZATION

Everyone concerned with occupational health must take account of the trend towards industrialization and urbanization in all countries today. In the highly industrialized states everyone is dependent upon or affected by industry. If this fails, unemployment follows with serious financial and social consequences.

The health of such industrial communities demands much large-scale planning by government, local authority and each individual industry. Industries have to be sited conveniently to the communities from which will come their labour and from which they will receive water, power, and their supplies such as coal, iron, clay, farm products, etc.

Factories have also to be placed so as to reduce any nuisance to populations or the countryside from smoke, fumes, slag-heaps, or waste discharges. Beautiful countryside and residential areas need protection.

In many countries the process of industrialization and urbanization is taking place so rapidly that whole areas need supervision to save them from harm. This has led to regional plans, with particular *zones* being set aside for residence, commerce, industry, and recreation and park-land.

The *siting* of factories and industry thus requires much negotiation between representatives of government, local communities, architects, engineers, and medical and health officers.

The health and medical features are many. They include the availability of housing for the workers, the amenities and beauty of the countryside, the prevention of industrial disease and injury, the supervision of the health of the worker and his conditions of service, and the disposal of wastes.

Everyone knows of the bad housing and ugly, unhealthy factories

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which resulted from the industrial revolution of the last century in England and Europe. Even worse conditions are arising in the insanitary, squalid shack communities in many parts of Africa, Asia and the Americas as people move into the towns and industries are established. A heavy responsibility therefore lies on such communities to prevent the social evils and ill health which follow the growth of uncontrolled towns, cities and industry.

FACTORY DESIGN AND LAY-OUT

Not only must medical and health officers be consulted as to where a factory or an industry will be sited in a neighbourhood, but also as to how it will be laid out on the site and the design of the buildings.

Such requirements as space, ventilation, lighting, changing rooms, wash and rest rooms, medical and first-aid centres, and the arrangement of machinery have to be considered by the medical and health advisers.

Ventilation is important in any industry to keep the working conditions cool, and to remove fumes, smoke and dust. In many industries such as mining, chemical factories, metal works, etc., good ventilation is essential to prevent the effects of heat exhaustion as well as to remove fumes and dust harmful to health. The various types of ventilation need not be known in detail by the nurse or health worker beyond recognizing that in such industries special exhaust hoods and extractor fans are required. Expert supervision to control the rate of ventilation and the temperature and humidity of the atmosphere is obviously necessary in any large factory. Good ventilation means a gentle movement of air, the maintenance of comfortable temperature and humidity, with the temperature about 60°–75°F. (16°–24°C.) and the removal of dust and fumes.

Lighting is now recognized as important for occupational health and efficiency. Again it has become a special study in advanced industrial communities. Light, whether natural through windows, or artificial, should fall on the working point, whether machine or drawing board, etc. from the left and above, and in such a way that shadow and/or glare do not arise (see Fig. 26). Frequently com-

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plaints from workers about bad lighting or eye strain are due, not so much to insufficient but badly placed lighting. A common example of bad lighting is where a worker, say at a factory machine, or

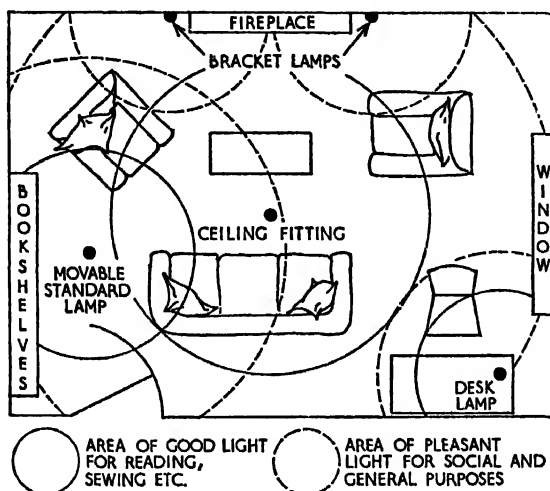


FIG. 26. Diagram showing the areas of light in a room

sitting at a desk, has a bright light low in front. This especially causes strain by its glare (see Fig. 27).

Lighting is also an important factor in keeping working premises clean and bright, very necessary to well-being and efficiency in work.

MACHINE DESIGN

Only some features of machine lay-out and design concern the medical and health officer. The needs to bear in mind are safety, avoidance of fatigue and adequate space.

Machines need to be spaced so that workers may move without risk, and with the minimum of effort. The reduction of unnecessary work and movements of workers and supplies is the basic purpose of the so-called 'work-motion' studies. Simply by changing the

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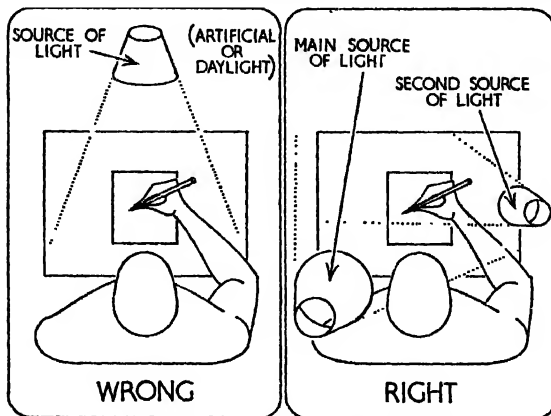


FIG. 27. Diagram showing a person writing in a bad and a good light. In the left-hand drawing the light is bad; it comes from only one light which is in front of the person and produces glare; in the other drawing the main light is over the person's left shoulder, not in front of him, and there is also a second light. It is always better when writing or reading to have two sources of light as this avoids glare (see also p. 189)

place of machines, and moving in supplies at the right points much time can be saved and fatigue avoided in factories.

Apart from machines being placed so that their moving parts are not dangerous, special guards are needed to prevent workers from being injured, for people are sometimes careless at work and the protection must be fool-proof. Moving belts have to be enclosed, saws and cutting tools provided with covers, and any moving part likely to trap a limb or clothing screened. In the case of industrial processes producing hazardous dusts or fumes, extractor hoods and fans have to be installed. Protective clothing, masks, and goggles are further requirements in working with factory machinery and processes in special industries see Fig. 32. p. 184.

One of the general advantages of *automation* of industry, where machines undertake more and more work with less and less human aid, is the decrease in the number of workers exposed to accidents and other hazards.

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JANITARY ARRANGEMENTS

General cleanliness and brightness of factories and industrial sites are important in more ways than one. A bright clean factory means usually intelligent, considerate management and efficient workers, a care for health and well-being and a knowledge that work is done better and quicker.

Allied with this is the provision of good wash and rest rooms, especially for women workers. There must also be well-maintained separate lavatory units.

Where dust, oils, greases or chemicals are involved in mining or factory work, wash and change rooms should be provided with hot and cold showers, wash basins and suitable soaps and creams.

Special clothing—overalls, gloves, helmets and boots—are a necessary supply in such hazardous employment.

A canteen food service is almost general in modern factories and drinking water is always at hand where heavy work is done in hot or confined places.

It is wise to forbid the taking of meals at the work-bench.

MEDICAL AND NURSING SERVICES

In even the smallest factory some of the workers should be trained in first-aid and in dealing with accidents and other emergencies. Increasingly, industries are appointing *nurses* whose duties are responsible and varied. The keeping of the medical records has already been mentioned. The nurse is there too to advise the workers to seek medical advice when she notices any sign of ill health. She can undertake first-aid work in accidents until the doctor arrives. She notes the general conditions affecting the health of the workers, and so makes herself aware of their problems, the type of work they do and the special hazards of the industry. She plays a most important part also in campaigns to teach health principles, prevention of disease, and the avoidance of accidents. She follows up workers who are ill or injured and helps during the time of their rehabilitation.

It is to be remembered that in most industries it is the ordinary

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general illnesses which mostly affect the work-people and so are a major cause of loss of work and wages, and of absenteeism. An occupational health nurse must then advise her work-people to consult their family doctors. In many countries the family doctor and local hospital undertake the care and medical treatment of those injured in factories or who fall ill from industrial disease.

The *industrial medical officer* in countries where treatment is in the hands of the general medical services has nevertheless responsible duties. He has to advise the management on the medical aspects of all the items discussed in this chapter:

- criteria of fitness of recruits
- analysis of medical records
- conditions of work—hours of duty
- health and sanitary conditions and facilities
- prevention of injury and ill health
- general well-being of the workers
- rehabilitation and re-employment of injured and disabled

INDUSTRIAL MEDICINE

This has become a large and special branch of medicine in which nurses are increasingly involved.

In some countries industrial medical officers and nurses deal with all features—prevention, treatment and rehabilitation of industrial and general ill health in industrial populations as well as with the measures to improve their health and efficiency. In others, individual medical and nursing care is undertaken by the local general practitioners and hospitals, while the doctors and nurses in industry are responsible for the special industrial features of prevention of disease and injury and supervision of health in the factory or industry.

The following are some of the more important features of industrial medicine:

- (1) Medical examination of employees
- (2) Keeping of medical records in the factory or industry. These

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are a guide to the fitness of each employee, his suitability for the job, and to the occurrence of injury or disease

- (3) Advice on the medical requirements of factory and industry design and operation, so that ventilation, lighting, space and other health factors are noted
- (4) Information on the hazards likely to occur and the means to prevent and treat them, e.g.
 - accidents in all industry
 - dust diseases (pneumoconiosis) in mining, quarrying, and use of asbestos
 - poisoning occurring in the use of certain dyes, oils, and metals.
- (5) Guidance to the industry on general medical means to keep the labour force fit and contented. This includes consideration of conditions which tend to cause accidents (fatigue, bad lighting, lack of safeguards), or disease (inadequate dust-control, failure to protect the skin against irritants, etc.), but also of circumstances which cause loss of morale such as the monotony of many mass-production methods, the lack of recreation, no opportunity for promotion, bad working-places and conditions, inadequate care, and people in jobs for which their temperament, aptitude or training does not suit them.

SOME INDUSTRIAL MEDICAL CONDITIONS

Injuries. Accidents are among the major causes of death and disability in industry whether it be on the farm or in the city. Certain industries are obviously more hazardous than others in the numbers who are injured or killed in them, for example, mining, construction and the heavy manufacturing industries.

The chapter on 'Accidents and Other Physical Hazards' (Chapter 15) contains much which is applicable to industry. However, certain facts are more important industrially.

The selection of recruits for many occupations which are especially hazardous must be made carefully. Not only must the recruits be physically and mentally suitable for their heavy or arduous jobs, but they must be checked for the conditions of 'accident-proneness'.

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Certain individuals by temperament or physical and mental constitution suffer or cause accidents more than others. A careful medical and work record will help to detect such persons.

Also in industry special attention has to be given to many other features to reduce accidents such as:

- (1) Training of work-people in the processes and machines they will use
- (2) Training in accident prevention, including fires
- (3) Training in first-aid
- (4) Careful spacing and design of machines with guards for moving parts
- (5) Preventive measures against the hazards of dust, fumes, and chemicals, including protective clothing devices
- (6) The avoidance of fatigue
- (7) Accidents are to be considered both in the human harm they do—death and disability—and in the economic waste they cause in loss of earnings for the worker, and the damage to machinery and loss of production.

Pneumoconiosis

These are chronic, fibrous diseases of the lungs due to certain dusts and so occur in mining in silica (silicosis) or asbestos (asbestosis) and in occupations (quarrying, grinding, manufacturing) in which such materials are used. Their prevention requires careful supervision of the workers, the prevention of dust, and its removal so that it is not inhaled. Many engineering and other measures are required such as good ventilation, wetting of rock being drilled, and removal of dust by exhaust ducts, etc.

Industrial Poisoning

There are many types liable to occur, of which previously lead poisoning in plumbers and painters was common. Other types of poisoning are due to arsenic, phosphorus and mercury in chemical factories, agricultural preparations (insecticides), several aniline dyes and organic chemical compounds.

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The poisoning may cause general constitutional effects, gastrointestinal disturbances, or damage to the blood or nervous systems, etc. There may be local effects such as dermatitis, due to direct chemical irritation or allergic reactions.

Allergy

This is a common industrial disease. Allergic conditions of the skin are frequently found where there is contact with certain dusts, powders, furs, feathers, or foods. It is found in bakers, cosmetic and chemical manufacturers, hat and fur workers, etc.

Conditions of Heat and Humidity

Stokers in ships, steel workers, miners, indeed anyone who works hard physically in hot and humid conditions is liable to suffer from heat exhaustion or even heat stroke.

Much can be done to prevent or reduce these consequences by careful selection of fit people and conditioning them to hard work by graduated preparation over some weeks, the avoidance of fatigue, adequate ventilation of working places, and by an ample provision of drinking water to which normal salt has been added.

Skin Diseases

These have been referred to above. Industrial dermatitis is common in many industries where workers are exposed to dusts, fumes, chemical or animal and vegetable substances.

People with a history of skin troubles should avoid work exposing them to skin irritants. Protective clothing, gloves or the wearing of overalls reduce or prevent such substances reaching the skin. In certain cases, special protective skin creams or lotions are advisable. High standards of skin cleanliness should be adopted.

REHABILITATION

Today most enlightened communities and management accept the duty of caring for their work-people in the broadest sense. Thus

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attention is given to the subjects already dealt with in this chapter—factory design, accident prevention, industrial disease and general health. However, a worker who has been sick or injured needs to be restored to health and efficiency. This is as much to the advantage of the country and industry as it is to the individual.

In Britain, the State provides sickness benefit and unemployment benefit under the National Insurance Act of 1946. The Workmen's Compensation Acts of 1925 to 1945 have been superseded by the National Insurance (Industrial Injuries) Act of 1946. It ensures against personal injury at work and prescribed industrial diseases. All employers and employees have to pay weekly contributions.

Industry, today, in most parts of the world, encourages medical and accident insurance schemes, and participates in systems of workers' compensation for the consequences of illness or injury received at work. In addition, industry participates in or even undertakes directly measures to rehabilitate its disabled work-people. The primary aim is to restore full health and capacity, but if this is impossible then to achieve the maximum benefit from medical treatment, convalescent care and special measures such as physical or occupational therapy. If a worker has lost a leg, for example, he is provided with an artificial limb, and trained in its use. If this disability has closed his previous occupation to him he is trained in other skills and work and helped to find employment. In Britain a disablement resettlement officer is found at each local employment exchange. He advises disabled persons.

Again the nurse in industry is a most valuable member of the team with her special personal knowledge of her work-people and their families. She joins with the doctor, welfare officer, physiotherapist, occupational therapist and employment officer in getting the disabled back to satisfying health and occupation.

Chapter 15

Accidents and Other Physical Hazards

ACCIDENTS

There is much truth in the statement that accidents now constitute one of the greatest causes of death and ill health. In industrialized countries they are the cause of both human and economic concern. Hospitals and rehabilitation institutions are being filled by injured people, so forming an important medical burden.

Medical responsibilities in connection with accidents are:

- (1) Adequate treatment and restoration of full health and function of the victims. This requires arrangements for first-aid, emergency and follow-up treatment and for rehabilitation of health and function
- (2) Medical and health advice in campaigns to prevent accidents
- (3) Training of students, both medical and nursing in accident work

Accidents occur anywhere and not least in the home. It is here that they are such a serious cause of death and disability in children, (see Fig. 28).

A lamentable fact about the alarming prevalence of home accidents is that such a high proportion are due to carelessness and ignorance. Falls, burns, suffocation and poisoning, again especially in children, are the most commonly met with accidents here. Some object left on the floor, a window left dangerously open, bad lighting on a stairway, or a wet, slippery bathroom or kitchen floor—

Accidents and Other Physical Hazards

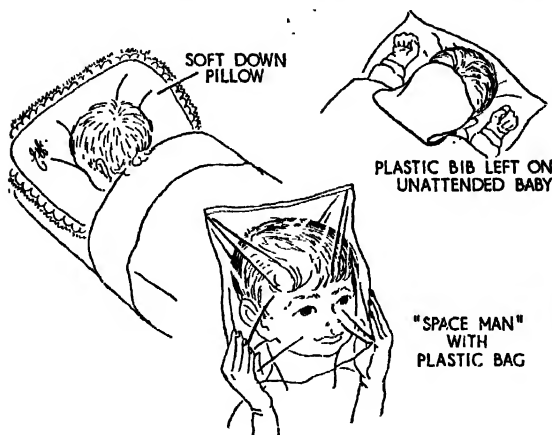


FIG. 28. The suffocation of young children. This can be caused by a young child burying its face in a soft down pillow; a plastic bib covering the the face of a child, or a child playing with a plastic bag

such common carelessnesses frequently set the stage for the falls which lead to a broken limb or a fractured skull (see Fig. 29). A shock from an old-fashioned electric socket low in the wall may kill a crawling infant; while that from a badly worn flex to an electric iron or fire may cause the death of a housewife. A gas stove not properly turned off, an open-hearth fire left unprotected, or defective electric wiring in a house are frequent causes of house fires. An accessible kettle of boiling water or a knife may injure a child.

These are but instances in home and school of the many factors leading to family and child tragedies, many of which could be avoided.

The prevention of such domestic mishaps calls for more thought in the design of living places, their lighting, heating and power supply. It also calls for such measures as checking the efficiency of electric wiring and appliances, the placing of protective guards and such devices before fires and stoves, the right use of oil fires and lamps, the removal of objects likely to trip people (see Fig. 30) the placing of poisons and dangerous objects out of reach of children,

Accidents and Other Physical Hazards

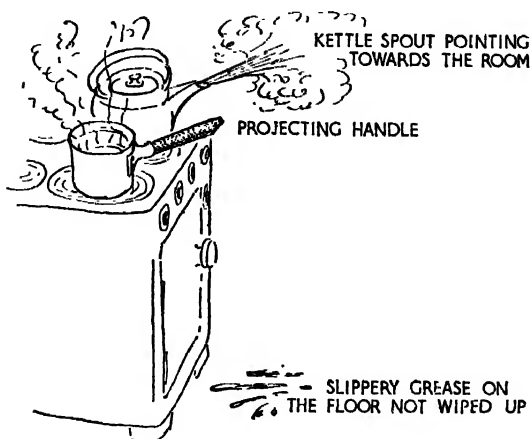


FIG. 29. The Kitchen can be potentially dangerous if handles of saucepans and the spout of the kettle are left projecting and if grease spilt on the floor is not wiped up immediately

(see Fig. 31) and the correct labelling of harmful substances and fluids which might be drunk by mistake. Other common hazards to guard against are the running of car engines in closed garages, the use of inflammable fluids near an open fire, and smoking in bed. As so many accidents have occurred among children whose nightgowns have caught fire, it is now illegal in Britain to sell nightwear

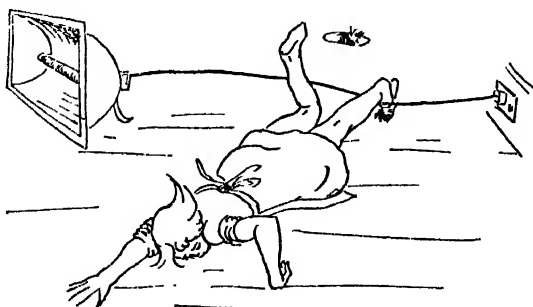


FIG. 30. A child tripping over the flex of an electric fire

Accidents and Other Physical Hazards

for children up to the age of twelve unless the garment is made of material which has passed the British Standard Test of 'low inflammability'.

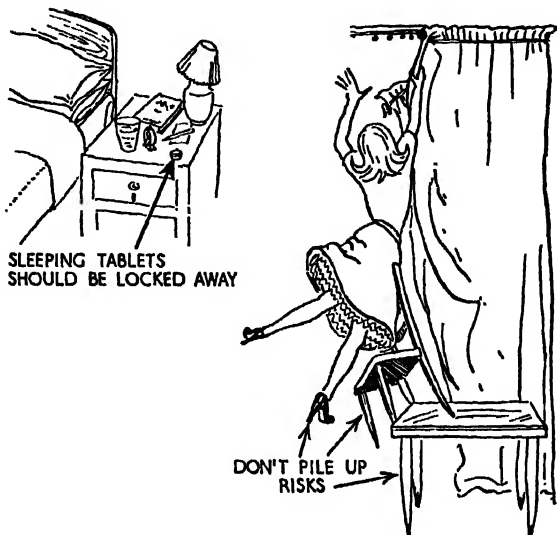


FIG. 31. Many risks can be avoided. Sleeping tablets should be locked away. Curtains should not be hung without first obtaining a secure foothold

Accidents in *hospitals*, hostels, clinics and similar institutions are but an enlargement of the home circumstances, and arise frequently due to similar errors and carelessness.

Road and transport accidents continue to increase as do the deaths and injuries from them. This is now so serious in every country in the world that the study of methods to prevent or reduce this serious group of accidents is most urgent. The types of accidents on road, rail or in the air, vary so enormously that no single or simple solution exists. On the highway the mass of traffic, its speed and type, the type of road and its size, surface and traffic aids, the standard of police supervision and traffic behaviour, are all factors. On the train or in the air there are other factors such as failure to maintain or check the condition of the train or aircraft, or of the skill of the

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pilot or driver to take action carefully according to signals or conditions. Then there is the serious problem of bad weather.

These multitudinous features affecting traffic, demand a wide-ranging list of counter-measures. Drivers of cars and other road vehicles must be trained and tested. They must be encouraged and educated in traffic courtesy and sense. Traffic must be under constant observation and control by trained police or traffic officers. All vehicles require checking to ensure their road-worthiness. Roads need design and construction to ensure that their capacity, gradients, lighting and traffic controls (lights and signs) are suitable to their purposes.

Accidents to public transport are especially disturbing in that many people may be involved. Again the causes are extremely varied—the failure of a brake in a bus or train, reckless driving, or the consequences of fog or ice, to name only a few of them. Aircraft and shipping accidents too are the result of such things as bad weather, faulty navigation, bad pilot judgement, or failure in an engine or other essential equipment.

Many of these multiple factors are controllable through better and more thorough education, training and testing of drivers and crew, supervision of the condition of the ship, train or plane, and the provision of efficient apparatus to guide and direct transport on rail and road, on the sea or in the air.

Another obviously serious group of accidents is that arising in *industry*. Carelessness in using machines or moving among them, the failure of apparatus, or the breaking of equipment, are all factors in the growing number of industrial accidents. A pile of stores may collapse, a boiler may burst, a retort of molten metal may tip, a container of oil may burn, a moving arm of a machine may catch human limbs or clothing—all are accidents common in factories. Then, underground, there is the fire in the coalmine, the failure of safety devices in mine hoists, the collapse of earth in a tunnel.

Such variety of accidents requires a comprehensive range of control and preventive measures:

- (1) A continuous campaign of training and propaganda in safety and emergency measures to be used in factory, mine and construction area

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- (2) The installation of guards to protect hands and fingers against moving machinery
- (3) The supervision of the efficiency of boilers, furnaces, and equipment generally, (See Fig. 32 for protective clothing.)
- (4) The adequate spacing, lighting and design of factories and their machinery
- (5) The provision of first-aid and medical teams to deal with injuries.



FIG. 32. Protective clothing

Medical and hospital care of accidents is now a specialized subject in many countries. Accidental injuries are to-day not merely frequent but are more and more complicated in the injuries they cause. Whether it be a road or factory accident the victims suffer seriously. Hence in the more efficient health and medical services dealing with accidents, special measures are arranged. There are specially trained medical, nursing and first-aid teams available immediately to treat multiple fractures, mass bleeding and shock. There are

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resuscitation teams to provide blood, serum or oxygen. There are special hospital units to treat fractures or skull injuries thoroughly and without delay.

The after-effects of accidental injuries may be amputations, paralyses, blindness, burnt skin, and other serious conditions. They have all added to the difficulties and costs of both hospital care and *rehabilitation*. Thus a whole service of doctors, nurses, physiotherapists and occupational therapists has come into being, to help the

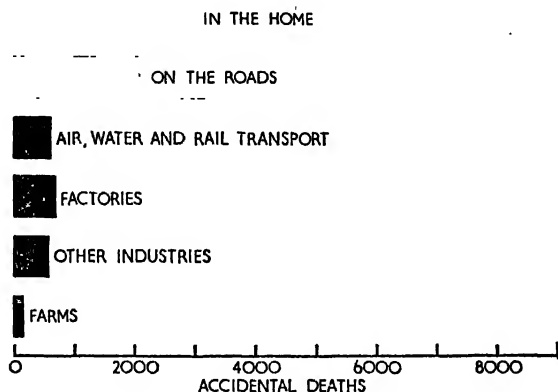


FIG. 33. Accidental deaths. A chart showing the occurrence of accidental deaths in Great Britain in 1962

victims to recover their former health and function as fully as possible.

DROWNING

The prevention of drowning follows the main principles for avoiding other types of accidents. As ignorance and carelessness are so frequently found in the story of most accidents, including those from drowning, a thorough educational campaign in a community is required. There must be training especially of children, in efficient swimming and in the simpler methods of life-saving. Then repeated reminders of the dangers of bathing in the sea, river and swimming-pool must be given, using the modern techniques of health educa-

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tion and propaganda. The ignorance about sea currents and tides, the uncertainty of depth of water in unknown waters, the likelihood of cramps after meals or in cold water or after long swims following lack of practice, and the risks of swimming alone, all are facts to be broadcast in guarding against accidents in the water.

There is the obligation on doctors, nurses and first-aid workers to be prompt and knowledgeable in an emergency. The revival or resuscitation of rescued individuals has to be tackled properly. The greater efficiency of the mouth-to-mouth, or mouth-to-nose artificial respiration should be accepted, and training in the method should be given to nurses, medical students, first-aid workers, and swimming-pool attendants.

CONSEQUENCES OF EXCESSIVE HEAT

Stokers on board ship, miners underground, passengers crowded in ill-ventilated ships, and labourers in hot countries are exposed to the effects of high atmospheric temperatures.

The human body maintains a finely balanced range of temperature in normal health, but people are not alike in the influence that increasing heat has on them. This difference is due to such factors as fitness, acclimatization, age, and nutritional state. Stout or ill persons, or those suddenly transported from a cool to a hot climate or hot working-place are susceptible to heat and may suffer seriously from its effects.

The human body reacts to rising atmospheric heat by diverting more of the blood through the surface vessels and by bringing the sweating mechanism into play. The sweat glands in the skin secrete sweat firstly in a fine film which evaporates if the atmospheric air is not saturated with moisture. If the body heat continues to rise, the sweat flows more freely, and especially when the atmospheric air is saturated, visible drops form on the skin. It is this physical process of evaporation which produces heat loss or cooling of the skin. Excessive sweating is not necessarily more effective in counteracting the influence of heat on the body, as the rate of evaporation does not directly increase.

These facts show that a hot, humid atmosphere is worse than a

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hot, dry one. Sweating and its cooling effect take place more readily in dry air. Air-movement produced by a natural breeze or a fan helps in removing the still saturated air next to the skin, and so loss of heat follows through a more rapid evaporation of sweat and transference from the hot skin to the cooler, adjacent air.

The environment, therefore, must be considered in terms of temperature, humidity and air-movement, in judging its heat effects on humans. A combination of high temperatures (i.e. near or over the average blood temperature), high relative humidity (water vapour) and airlessness (no breeze), is dangerous for man. This is especially so when he is working physically, is not fully fit, or is not conditioned or acclimatized to hot environments or hard physical work.

The importance of climatic differences to health is partly due to heat and humidity. Hot, humid climates affect the physiology of man by the strain put on his cooling mechanism, and the divergence of blood from internal organs and muscles to the subcutaneous areas. Hence muscular work is more difficult and the general physical discomfort of hot, or hot and humid environments and climates also lowers human energy and mental vigour.

High temperature and humidity are not limited to geographical climates only. They may occur in special circumstances as in mines, factories or other enclosed hot places, especially if ventilation is poor.

The effect of these conditions may lead to ill health or even death. The first stage is *heat exhaustion*, shown by such symptoms as weakness, dizziness and severe perspiration. Recovery occurs easily, but if the bad conditions continue then *heat-stroke* (frequently but wrongly called sunstroke) may follow. A rising body temperature, dizziness, mental signs, and even unconsciousness leading to death may occur.

The *prevention* of the ill-effects of heat calls for the following:

- (1) Avoidance of sudden, excessive, muscular work in hot and humid climates and environments
- (2) A process of acclimatization for workers, troops, or others proceeding to or in such environments or climates. This requires a system of graduated exercise and training over some

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weeks. This policy was followed before sending troops from temperate climates into fighting in the desert in summer in the Middle East during the Second World War.

- (3) The use of suitable clothing. The lighter and looser this is the better, to aid loss of body heat and perspiration. It should be light (white) in colour because this reflects the heat rays of the sun.
- (4) The adjustment of diet and exercise to the climate, which in effect means light, digestible meals, and regular, but not too strenuous games, walking etc. Increased salt is needed in the diet to counteract that lost in perspiration. Alcohol is inadvisable.
- (5) The improvement of working and living conditions in the form of well-ventilated buildings, suitably sited to benefit from through ventilation. Increasingly, the more efficient and cheaper fans and air-conditioning units have led to greatly improved living- and working-places, especially where electric power is readily found.
- (6) The provision in bad heat situations of special heat treatment centres and special staffs. If at all possible these should have air-conditioning, or fans, and ice.

THE HAZARDS OF SUNLIGHT AND LIGHT GENERALLY

The effects of sunlight have previously been confused with those of heat. 'Sunstroke' is really heat-stroke.

Sunlight is composed of the spectrum of light from the infra-red to the ultra-violet rays. The infra-red are the heat rays already referred to; but the rays responsible for the typical sunburn or other harmful consequences of too much exposure to sunlight are at the ultra-violet end of the spectrum. They have the power of slight penetration of the superficial skin layers, but are easily absorbed by dust, smoke, and even window-glass. The power of ultra-violet light is both harmful and beneficial to man and indeed life as a whole. This light is stimulating to animal and plant, and in man is one of the factors in the formation of vitamin D in the skin which is essential for the metabolism of calcium and phosphorus, and hence in bone

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growth. Rickets is thus a disease more likely to occur in climates or environments deficient in ultra-violet sunlight. Moderate and regulated sun-bathing is healthful—it is physiologically stimulating, has a slight bactericidal action on the skin, and is helpful to the general metabolism.

Excessive and injudicious exposure of the skin and eyes to the sun is harmful. Sunburn, besides the local skin effects of reddening, swelling, and even vesiculation, has general toxic consequences of headache, malaise and fever. Continued exposure is damaging to the skin in causing wrinkling, and in some people even skin 'cancers'.

It is convenient to refer to *glare* (see pp. 170–2), i.e. the unpleasant effect upon the eyes of too much direct or reflected light, whether natural sunlight or artificial light. Glare is the consequence of too much light falling directly upon the eye, causing contraction of the iris and yet stimulating the retina. Severe and even painful eye-strain is caused, of which an extreme type is 'snow-blindness'. The avoidance of the impact on the eyes of the light causing glare is the natural means of dealing with it, but is obviously not possible in snow-fields and similar excessively light-reflecting situations. Suitable sun-glasses are then justified, i.e. glasses known to possess the power of reducing the intensity of the light and particularly that in the ultra-violet range. Nevertheless, the habit of wearing sun-glasses unnecessarily is unsound, as the eyes in normal situations have a good capacity for adjustment. This natural protection should be accepted in normal situations. Heavily tinted glasses filtering out too much light have their hazards, as the wearer, passing suddenly from a bright exterior to a dim interior may be blinded and exposed to accidental falls or collisions.

Ordinary common sense in the use of window light, or reading and working lights can prevent glare in home or factory in most cases. Placing a light in front of the eyes, or working facing such a light or window invites glare and strain. Any source of light, natural or artificial, should be well above, and preferably slightly to the left and behind the person using it. The working surface, whether book or drawing board or machine, is then clearly lit with the absence of glare and shadow. (See Figs. 26 and 27, pp. 171 and 172.)

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Care in the design and use of natural lighting is worthwhile in preventing glare and its opposite, insufficient light. Costs of artificial lighting are kept down, eye strain and confusion are less, and speed and ease of working are aided.

The factor of glare in vehicular traffic and in causing road accidents needs no emphasis, but its reduction is not simple, for the experts in different countries still argue about the relative values of different lights or beams.

RADIATION HAZARDS

Consciousness of the hazards of radiation has come only recently as a consequence of the study of nuclear and atomic science. The deadly effects of radiation released by atomic and nuclear bomb explosions are both immediate and long term. It is the probable damage to the human reproductive cells resulting in physically and mentally distorted and deficient succeeding generations which is a sombre anxiety at present. This is a distinct possible consequence of the accumulation of radiation from repeated atomic and nuclear explosions in weapon testing. Hence the medical and health concern in the abolition of nuclear armaments.

A secondary result of the mounting interest in this field has been the medical disapproval of excessive use of X-rays. Unjustifiable procedures have been the unnecessarily repeated X-ray pictures of pregnant women, of any and every medical, surgical and dental case, and worst of all, of shoe fitting in ordinary commercial shops. It is the cumulative potential of repeated and excessive X-ray procedures which are the threat, and which have led recently to the medical demand for responsible and expert control of their application.

NOISE

Noise, like light is relative in the impact it has on human beings. The unattuned individual suddenly thrown into a noisy metropolis to sleep, or placed in a vast steel works will become distraught, while his accustomed neighbour will be unperturbed. This demonstrates how the physiological and psychological process of acclimatization

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or adjustment guards the individual, and enables him to achieve a relatively satisfactory life of work and sleep. Yet the barrage of noise spreading in the industrialized and mechanized communities of man is now being questioned. Accepting the value of conscious adjustment of most people to this ceaseless uproar of road traffic, aircraft, industrial work and movement in thickly inhabited areas, there is the possibility that cumulative strain and subconscious damage may exist. Sleep is lost or disturbed and much work and social life are obstructed.

Campaigns are therefore now being pressed to reduce noise, or to protect individuals from it. Jet aircraft, airports, traffic sirens, construction work and many other sources of noise must be made quieter. Buildings, especially those which are flats, more and more need to have walls insulated against noise.

ATMOSPHERIC HAZARDS

The damage following storms is not included here, though medical and health workers are frequently called into action in such catastrophes. There are, however, many health hazards traceable to altered or disturbed atmospheric conditions.

Climate is but an aspect of different atmospheric and related conditions, which has been mentioned in another chapter. The temperature, humidity and movement of the air or atmosphere make for healthy or unpleasant 'climates', whether in certain geographical regions or in special places, such as factories, mines or dwellings.

What happens in excessive heat has been described on p. 186. Lack of heat, which means *cold*, may also be a serious health hazard, when for example, blizzards strike communities not accustomed to or prepared for them. Individuals then die of exposure to cold, or suffer frost-bite.

Cold is countered by obvious methods of housing or shelter suitably constructed, and increasingly, in modern communities by using various forms of central heating. Modern clothing and footwear is more effective in conserving body heat by use of light-weight and wind- and water-proof materials. The process of

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acclimatization is also effective in helping to endure increasing atmospheric cold and bad weather conditions. Trained troops prepared for mountain or arctic war demonstrated this effectively in the Second World War.

The development of modern buildings has meant much ingenuity in methods of *ventilation* and air-conditioning to provide healthy conditions in factories, offices and homes, whether the external climate or atmosphere be hot or cold. As we have seen, the physiological optimum requires an air-temperature not too warm, a humidity also moderate and some air movement. Thus the science of ventilation has attempted to influence the design of buildings and air-conditioning equipment. In this respect it is to be noted that the variation of the amount of oxygen or carbon dioxide in ordinary external air involved in ventilation, whether natural, through windows or louvres, or artificial, through ducts with fans, is not significant or dangerous. The discomfort occurring in typically badly ventilated rooms is nearly always due to the *physical* state of its atmosphere, i.e. its high temperature, humidity, and its lack of movement (stiffness). The science of ventilation in ordinary circumstances, i.e. factories, ships, schools and homes attempts to give the most desirable combination of these three factors—temperature, humidity and air-movement. A useful range is:

temperature of 65–70°F. (18–21°C.)

relative humidity 40–50 per cent

slight (almost unnoticeable) air movement.

Various arrangements of doors and windows, fans, or radiators and air-conditioning units are made to fit the building and its purposes. But as a rule, in ordinary homes in temperate climates, there should be large windows to give maximum light and adjustable air flow, and they should be placed in walls opposite or at right angles to doors or other windows. This helps cross-ventilation and thus movement and turnover of most of the air in a room.

Heating of a room to ensure a suitable and comfortable room atmosphere is preferably achieved by combined air-conditioning

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and radiation units, or by electric, gas, or hot-water panels. Cheerful though the open fire is, it has too many disadvantages to be used as the method of choice for home heating. It is uneconomical, as most of the heat goes up the chimney and it adds too much smoke to the polluted atmosphere of industrialized countries.

An essential requirement in good and economical heating of a building, especially in very cold climates, is proper insulation of the walls, floors and ceilings. Otherwise heat is lost through these almost as quickly as it is produced by heating panels or central-heating systems.

ATMOSPHERIC POLLUTION

This grows rapidly in importance as a public health problem. In recent years in heavily industrialized communities, death and disability from 'smog' have been not infrequent.

The ordinary unpolluted atmosphere consists of gases in the following approximate proportions:

Nitrogen 78 per cent

Oxygen 21 per cent

Carbon dioxide 0.04 per cent

Other rare gases—less than 1 per cent.

Pollution is occurring from:

Domestic and industrial fires

Industrial gases

Exhaust gases from internal combustion engines

(Gasoline or diesel vehicles)

Garden or bush fires.

Effects are destructive. The sulphur and other acid and corrosive elements in a smoke-laden atmosphere blacken and corrode buildings, wilt plant life and are damaging to human lungs and bronchi. When certain temperature and pressure combinations occur in the atmosphere, the extreme consequences of pollution are seen in 'smog', i.e. fog or mist polluted with smoke and gases.

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The exact physical and possibly chemical interactions causing 'smog' are not altogether known, but their origin in atmospheric pollution justifies campaigns for cleaner air. These demand the reduction of domestic fires in open-hearth fireplaces, the burning of garden rubbish, the smoke and gas from factory chimney, and the exhaust from car and diesel lorry.

A specially dangerous example of atmospheric pollution is *carbon monoxide* poisoning. This occurs in poor households through burning a fire in an open bucket or grate in a room tightly closed, and lacking chimney or flue; or where a car or lorry engine is kept running in a closed garage. The danger is serious, as carbon monoxide is odourless and its victims rapidly lapse into unconsciousness.

Industrial dusts as pollutants are referred to in the chapter on industrial and occupational health, (see p. 176).

Chapter 16

Health Aspects of Some Chronic Diseases

The term 'chronic disease' to describe conditions which persist for long periods is increasingly disliked by patients when applied to their hospitals or wards. This is because of its association with incurable disease. Such suggestion of hopelessness is unwise. Increasingly the sufferer of long-term disease and disability is today able to obtain more comfort, if not a return to full vigour. It is hope, not despair, which he should have.

Chronic or persistent ill health has become a much more obvious and important problem in recent years in the developed countries of Western Europe and Northern America. This is partly due to the populations of these regions living longer so that a greater proportion reach old age. It is in elderly people that many chronic diseases are most damaging and prominent, but it is nevertheless a mistake to consider such conditions as peculiar to old age. Many chronic diseases commence much earlier in life and frequently cause ill-health in younger age groups.

Another reason for the increasing proportion of chronic diseases in the countries mentioned is the decline and even disappearance of many of the acute diseases, especially those of the infections. In the days of epidemics of typhoid, diphtheria, cholera, acute tuberculosis and pneumonias, the chronic conditions were relatively less common and were naturally overshadowed by the dramatic effect of the deadly diseases.

Today, therefore, chronic diseases are important because of their prominence in causing ill health, in filling hospitals and related institutions and in adding to the difficulties for families and communities in which there are many such sufferers. They

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deserve notice also because of the better care and more promising outcome to treatment and rehabilitation which is now possible. The effort to provide this is necessary not only for humanitarian reasons, but to reduce the economic and social burdens otherwise borne by families and communities.

THE CHRONIC DISEASES AND DISABILITIES

These diseases have some common features. Their name is an indication of one obvious characteristic. Sufferers from them have to face long periods of continuous or intermittent discomfort, weakness and even pain and deterioration. Thus medical and nursing care must usually be maintained for a long time.

Many acute diseases, provided the patients recover, do not necessarily cause permanent damage. The chronic diseases, on the other hand, nearly always result in some definitely harmful change. This usually means some decrease in the vigour of the individual, and even lessening of the function of one or more of his systems of locomotion, respiration, circulation, etc.

Then the medical and nursing services have to provide a wider range of care to treat and restore patients with long-term diseases. As the majority are elderly, there is the added problem of counteracting the physical and emotional changes due to increasing age.

Nursing, feeding, occupational therapy and rehabilitation have all to be constantly and expertly given. The association of long-term illness with old people so frequently means an increase in the deterioration which occurs. The degenerative changes of ageing are added to those due to the chronic disease in many cases.

The question of age naturally influences the proportions or rate of the different chronic diseases occurring in a community. In the older age groups death and disability are commonly due to heart disease, arthritis, hypertension, cancer and nephritis. Accidents, too, become a more serious problem in these groups.

SOME FACTORS IN PREVENTION AND TREATMENT

In that many of the processes causing chronic diseases com-

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mence in youth or middle age, the attack to prevent them has to begin in these years.

Firstly, then, such general measures should be taken to improve health as health education, improved nutrition, good housing, better personal health practices, avoidance of excessive eating and drinking and the stopping of smoking.

Secondly, early signs of disease and disability should lead to the necessary treatment. Recent experience has given hope that prompt diagnosis and care can cure or at least reduce the worst results of many diseases. Included in this group are diabetes, syphilis, such nutritional diseases as beri-beri, pellagra and rickets, gout, rheumatoid arthritis, asthma and tuberculosis.

We have already pointed out how much more optimistic it is possible to be about the results of medical treatment. Cure is not necessarily possible, but much can be done to make life more tolerable and even productive. The science and art of rehabilitation are responsible for much of the improvement.

Good, constant nursing, teaching the patients to care for themselves even though handicapped, and vocational training are important. Where necessary, specialized medical and surgical treatment to correct deformities or to treat such cases as 'cancers' should be given. It is particularly valuable to give these people personal encouragement, interest in some occupation where possible, and companionship. Many sufferers from chronic diseases may be unable to continue their previous work, but, nevertheless, can do something. To help them achieve this is rehabilitative work: it gives them a purpose in life, it protects their self-respect and reduces the economic burden on their families and the community.

A few of the more common types of chronic or degenerative diseases are described in the following text.

THE 'CANCERS'

In some respects the word 'cancer' is unsuitable. It is alarming. It is also vague, for the group of diseases called cancers is a large one, including many types ranging from the very serious ones such as melanoma and some glandular and tissue neoplasms, to some of

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the very slow-growing skin cancers. Again, cancers which occur in organs or sites of the body allowing early detection are more likely to be successfully treated and even cured than deep-seated types.

More and more is being learned of the complex circumstances giving rise to malignant disease. It has long been known, for example, that some compounds in coal-tar may produce skin cancers. Today, much is known of these and other carcinogens, which are substances which have the power to cause cancer. Many occur in industrial substances, in oils, tar, chromates, etc. Excessive sunlight and electronic rays (X-rays) are also capable of stimulating skin cancers, while such substances as chromates, nickel, arsenic compounds and asbestos may be associated with some form of malignant disease.

Today, the evidence linking cigarette smoking with lung cancer, a rapidly fatal condition once it is established, is overwhelming.

There are also various facts about the geographical, racial and occupational occurrence of certain malignant diseases which promise the possibility of discovering the causes and circumstances in which these occur. There are thus certain liver and lymph cancers in Africa; skin cancers in sailors, nasal cancers in some metal industries and lung cancers in heavy smokers.

The discovery of so much about 'cancers' is one reason for a more hopeful future for cancer sufferers. Already much can be done to prevent, or at least reduce, the more serious consequences. To stop smoking is one obvious and certain way to reduce lung cancer. To avoid over-exposure, year after year, of the skin of the face and head to sunlight, reduces the possibility of cancers in these areas. To prevent contact with certain fumes (chromates) and certain tar oils in industry again helps to lessen the incidence of occupational cancers.

Modern treatment, either surgical or radiation (deep X-rays, cobalt 'bomb') helps greatly in combating malignant disease. Many conditions, especially if diagnosed early enough, are halted or even removed by treatment. Thus a full preventive programme against cancers includes a search for suspected conditions (breast tumours, skin ulcers, persistent throat or lung complaints, etc.) as early as possible, and then provision for adequate treatment.

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Cervical smears (Papanicolaou smear) can be invaluable in the early diagnosis of cancers in women.

Health education to persuade people to have adequate regular medical examinations, or to seek advice for suspicious signs, such as a lump in the breast, or a persistent smoker's cough, has to be carefully conducted. Certainly there is a great advantage in cancers being detected early and treated; on the other hand, too much emphasis on the more frightening reasons for seeking advice can be harmful. Skill is needed in such campaigns to teach people to be watchful and yet not to make them morbid or hypochondriac.

It is encouraging, however, that the cancers are not all fatal, nor all very serious. Modern medicine offers more and more knowledge in preventing them and better means to cure or to delay their worst effects, or to make life generally more tolerable for many cancer victims. The nurse has a most important role in helping her patients to be hopeful and philosophical.

HEART AND CIRCULATORY DISEASES

This is another group of mixed diseases which is responsible for much chronic illness and, in the older age groups, is the main cause of death.

The causes of heart disease are such acute infections as rheumatic fever, such chronic diseases as syphilis and constitutional diseases as hypertension or coronary arterial degeneration.

Circulatory diseases which lead to death or, if the patient survives, to much invalidism, are hypertension, arteriosclerosis, renal diseases and cerebral thrombosis.

Preventive measures are similar to those for many other chronic conditions. General public health programmes thus include dealing with rheumatic fever, other streptococcal infections and syphilis, and improving personal health by more physical exercise, moderation in eating, and by following regular habits of work and recreation.

Early treatment is valuable in counteracting the worst effects of heart and circulatory disease. Open heart surgery can deal with even gross defects of the valves, while medical treatment and a wise

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régime of diet and moderation in exercise and work are able to offer comfort and health to many.

Rehabilitation is another modern procedure which has made life much more tolerable for both the sufferers and their families.

Patients are taught to keep their physical effort within the limits of the power of their heart and circulatory systems, but, nevertheless, to do as much as possible themselves and even to undertake suitable occupation. It is especially important to encourage optimism and determination in them and to persuade them to avoid self-pity and weak resignation to their disability.

In both the treatment and rehabilitation of patients with heart and circulatory diseases, the nurse again is not the least valuable member of the team. She is the only member to know the patient in all stages, his ups and downs, his moods, his reserve of physical powers and his degree of determination to make the best of conditions. She gains the necessary personal knowledge to guide the doctor in treatment and rehabilitation. More than most factors, her patience and powers of persuasion, allied with nursing skill, mean the difference between steady recovery and failure.

Most sudden deaths in adults in the more developed countries are due to coronary disease, i.e. disease of the coronary arteries of the heart. It is in adult men that this is most frequently the case. Much is still not understood about the causes and circumstances of this serious disease. However, it is well established that sudden death due to coronary heart disease is but the final, dramatic event in a chronic condition of the arteries and especially those of the heart. It is the result of the general pathological changes produced by arteriosclerosis. Sudden death is often the only obvious event, but in many cases, several attacks of coronary thrombosis occur. Improved treatment and care of such patients have helped many to survive and even to return to useful, if less vigorous, working lives.

Severe heart disease and sudden death often men that a life is lost in its prime. The advanced stages are often the final ones when it is too late to do anything very effective for the patient. Hence there has been intensive research into the earlier stages and especially into the possible factors which produce arteriosclerosis and

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coronary disease. The obvious purpose is to gain knowledge to use in preventing these conditions from progressing to their fatal terminations.

Much is now known of the earlier conditions and circumstances of arteriosclerosis and coronary thrombosis. The time is perhaps near when the factors may be defined which predispose a person to the disease or even cause it. For example, it is now generally agreed that the substance cholesterol in the blood serum is important, though opinions still differ as to its exact role. The level of cholesterol is invariably high in patients with advanced arteriosclerosis and thrombotic disease. However, conversely, it is unwise to worry too much about every individual who shows high cholesterol figures, as these are influenced by many factors including age and sex.

The blood pressure is a significant indicator. Arteriosclerosis is invariably associated with high pressure. In a very general sense, a very high blood pressure which is rising shows an increasing risk of thrombosis.

People who are excessively fat and continue to gain weight are also considered to have a greater likelihood to suffer from coronary thrombosis. Evidence, too, is confirming the belief that heavy smokers, or those with a long history of smoking, are liable to suffer from the disease. Consequently a picture is becoming clearer in which a combination of the factors mentioned is a warning of a predisposition to thrombosis, especially of the coronary vessels. Hence the value of health campaigns to persuade people to live moderately by the avoidance of over-eating and drinking too much, to stop smoking, to take physical exercise regularly and to live a life with a variety of interests.

ARTHRITIS

The arthritic diseases form another group which is very important in modern ageing society. These are not killing diseases, but are the cause of immense suffering and disability.

The group includes rheumatoid arthritis, infective arthritis and traumatic arthritis. Another group of diseases does not immedia-

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tely have joint changes, but shows similar results in the occurrence of pain, discomfort and the loss of free muscular movement. These include conditions known as fibrositis and myositis.

Altogether these diseases by causing much human misery and economic consequences are an increasing medical and health problem in communities with a growing proportion of elderly people. These chronic diseases demand more medical treatment and rehabilitation for the patients suffering from them and more vigorous preventive campaigns.

The control of infective arthritis, in effect, requires the prevention and treatment of such diseases as the streptococcal infections, tuberculosis and gonorrhoea as these frequently have crippling joint complications.

Rheumatoid arthritis is a complex disease which has still to be thoroughly investigated. Its causes, or the conditions which predispose to it are unknown. It is often aggravated by infectious or other acute diseases, or by general debility and mental depression.

Prevention, therefore, has to be sought by general measures to improve health. In other words it is necessary to prevent and treat those infectious diseases likely to have joint complications, to encourage healthy, active living, to improve nutrition and to encourage a cheerful attitude to life.

Physical therapy is important and implies heat and water treatment, massage and active and passive movements of joints and limbs. Such measures are a major part of rehabilitation and offer much hope to arthritic sufferers to find relief from discomfort and a return to a more active and useful life. Rehabilitation depends upon nursing and other care. Persuading patients to be cheerful and optimistic is valuable.

Cortisone and similar drugs carefully used under medical control is a helpful means of halting the progress of rheumatoid arthritis.

ALLERGIES

Allergies are one of the commonest of disabilities. If minor forms are included, every other person is a sufferer. Most allergic condi-

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tions are long-lasting, at least in their latent forms. Most people who suffer definite attacks of asthma, hay-fever, naso-pharyngeal irritation, or skin allergies are thus victims of a chronic disability. It is also unfortunate that so many patients have varied reactions ranging from asthma and gastro-intestinal disturbances, to mild nasal or skin irritations.

These allergic reactions occur too as a result of exposure to a wide range of substances such as pollens, moulds, foods, fibres, dust and drugs. The reactions are an abnormal change in the immunity responses of the body to the presence or absorption of these foreign substances. Hence this group is similar to most other chronic conditions and an understanding of its causes and circumstances is difficult. Persistent and chronic although allergies are, there is nevertheless much that can be done to reduce their effects. Cure is even possible especially in the earlier stages of many of them. The unfortunate sufferers are particularly those with resistant asthma who in later life have chronic bronchitis as a serious and developing complication.

The treatment and prevention of allergic conditions are frequently difficult. Firstly, the search for the foreign substance or allergen usually takes a long time and requires much patience. Secondly, the patient has to have his general health and emotional attitudes studied, as allergic reactions are much influenced by such personal factors. Thirdly, the trial of a variety of changes of diet, or environment or drugs must be made to determine their part in curing or reducing the allergic reactions. Rooms have to have their house-dust eliminated, feather pillows must be removed, certain flowers or items in the diet avoided and emotional stress and fatigue kept to a minimum.

It is fortunate that many childhood allergies disappear as the child grows up, and that modern courses of desensitization (immunization) cure others. A careful control of the environment and the avoidance of specific allergens helps many, while the newer drugs, including the broncho-dilators and antispasmodics, control most symptoms in many patients and hence prevent the development of serious ill health.

In that many allergic patients suffer from less obvious constitu-

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tional effects over and above the acute specific reactions such as hay-fever or asthma, they tend to become chronically ill and depressed. Once again, as in most chronic diseases the doctor and the nurse are able to achieve remarkable improvement by a continuing careful régime of treatment and supervision. Maintaining the general health and mental encouragement to the patient is important. Thus, many a vicious circle can be broken and a chronic sufferer of asthma, urticaria or hay-fever restored to a normal, productive and tolerable life.

Chapter 17

Health Services and Their Organization in England and Wales

MINISTRY OF HEALTH

The central authority responsible for the health of the people in England and Wales is the Ministry of Health. It was created in 1919 by the Ministry of Health Act and it took over the duties of the Local Government Board and functions of other government departments which dealt with matters of public health. In 1951, its functions concerning local government, housing and environmental health were transferred to the newly formed Ministry of Local Government and Planning, now called the Ministry of Housing and Local Government.

The chief duties of the present Ministry of Health are the administration of the National Health Service and responsibility for the health and welfare services of local authorities. The Ministry of Health thus supervises and advises a variety of regional and local authorities concerned with hospital, medical and health functions. It is also empowered to make arrangements for research into health matters. The Chief Medical Officer of Health is also the Chief School Medical Officer to the Ministry of Education. This means that there is a strong link between the maternity and child welfare services and the school health services.

When the National Health Service Act came into force in 1948 its aim was to provide a comprehensive health service to improve physical and mental health throughout the country and to prevent,

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diagnose and treat illness. The structure of the service is in three main parts. There are the hospital and specialist services which the fifteen Regional Hospital Boards administer. There are the general medical, dental, pharmaceutical and supplementary ophthalmic services administered by the Executive Councils and there are the local health authority services which the County Councils and County Borough Councils administer.

THE HOSPITAL SERVICE

Although the Regional Hospital Boards administer the greater number of hospitals in England and Wales, the teaching hospitals, where medical students are trained, are run by Boards of Governors. Medical students train in hospitals in Newcastle upon Tyne, Leeds, Sheffield, Cambridge, Oxford, Bristol, Cardiff, Birmingham, Manchester and Liverpool, and London contains twelve large teaching hospitals. They are The Royal Hospital of Saint Bartholomew, The London Hospital, The Royal Free Hospital, University College Hospital, The Middlesex Hospital, Charing Cross Hospital, St. George's Hospital, Westminster Hospital, St. Mary's Hospital, Guy's Hospital, King's College Hospital and St. Thomas' Hospital. There are also The Hammersmith Hospital, where much postgraduate study is done, and thirteen specialist hospitals which are run by Boards of Governors.

The other hospitals administered by Regional Hospital Boards fall into fifteen geographical regions each having its own Regional Hospital Board. The Regions in England and Wales are called: Newcastle upon Tyne, Leeds, Sheffield, East Anglia, North West Metropolitan, North East Metropolitan, South East Metropolitan, South West Metropolitan, Wessex, Oxford, South Western, Welsh, Birmingham, Manchester and Liverpool. Each Regional Board has a staff of secretaries, treasurers, engineers, senior administrative officers, nursing officers, architects and other officers but the members of the Board are appointed to serve on it in a voluntary capacity. Under the Regional Hospital Boards are the Hospital Management Committees which arrange the day-to-

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day running of the hospitals. These have salaried officers such as the secretary, finance officer, supplies officer and engineer but the members of the committee all work voluntarily for the hospital or group of hospitals they serve.

EXECUTIVE COUNCILS

There are 138 Executive Councils in England and Wales and each is responsible for the general practitioner services in its area, dental services and pharmaceutical and supplementary ophthalmic services which provide glasses for so many of its inhabitants.

LOCAL HEALTH AUTHORITY SERVICES

Local authorities have been set up throughout the country and consist of the elected representatives of the people in the area. The major local authorities are the County Councils and the County Borough Councils. They work through committees of members, which co-opt other persons with special experience. Other authorities are municipal borough councils, urban district councils and rural district councils. These have fewer powers and duties than the county and county borough authorities.

Local authorities carry out certain duties prescribed by Act of Parliament. Some duties are compulsory and others are permissive. For instance, the local health authority has to provide antenatal care for expectant mothers: it must provide sufficient midwives and maternity nurses. It also has to provide health visitors, home nurses and ambulances. It must make provision for vaccination against smallpox and immunization against diphtheria and certain other diseases. The provision of domestic help where there is illness in a family is a permissive power given to all local authorities. Arrangements for the prevention of illness, care and after-care may be made by the local health authorities, for the Act states that 'A local health authority *may* with the approval of the Minister, and to such extent as the Minister may direct *shall*, make

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arrangements for the purpose of the prevention of illness, for the care of persons suffering from illness or the aftercare of such persons'. Under this clause, the Minister of Health has imposed important duties on local health authorities, including the care and aftercare of persons suffering from tuberculosis and from mental disorder.

The local authority is empowered to spend money derived from rates to carry out all these services. It may receive an exchequer grant to pay for certain services; this money will be derived from taxes. For some services the recipients may be required to pay.

THE PUBLIC HEALTH DEPARTMENT

In every public health department there is a medical officer of health who is the chief executive officer. He may have other specialist medical officers working under him. In his department work the health visitors, the district nurses, the midwives and home helps. Health visitors are trained nurses with a special training in health visiting. The Council for the Training of Health Visitors is responsible for this. Other important members of the medical officers of health's staff are the public health inspectors. They are responsible for the sanitary condition of buildings, disinfection and disinfestation where necessary, and also for the inspection of food and for clean air. There is also a large clerical staff who work in the public health department under a chief clerk. The mental welfare officer is a comparative newcomer to the staff of the public health department. These officers were appointed under the Mental Health Act of 1959. They help to provide for mental wellbeing in the community and have power to make application for the compulsory admission to hospital or guardianship of a mentally disordered person. The mental welfare officer must do this in consultation with the patient's relatives if they can be found. A number of other social workers work for or in collaboration with the department of health.

The public health department is a busy one. It arranges and staffs antenatal and child welfare clinics in its area. Immunization

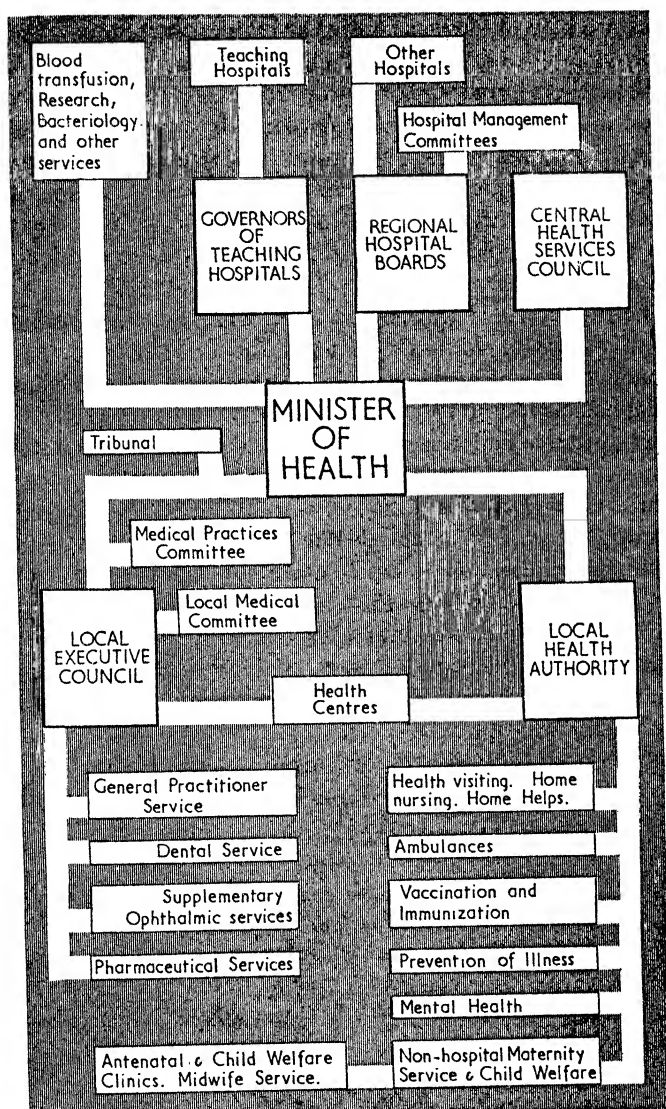


FIG. 34. Organization of the Health Services in England and Wales

Health Services in England and Wales

clinics are held at various centres at regular intervals. Nurseries are provided for children under five years of age especially those whose mothers have to go out to work. These nurseries have to be staffed and the health of the children carefully supervised. Another duty of the public health department is to register persons under the Nurseries and Child-Minders Regulation Act. Anyone who, for gain, looks after more than two children who come from more than one household, must be registered with the local health authority.

When possible, training and occupational centres are organized for both backward children and adults, and home therapy may also be made available for them. Some local authorities provide residential hostels for the mentally handicapped. The residents go out to work but live under supervision until they can take their place in the community.

There is close co-operation between the public health department and other departments in the care of children in problem families, and the welfare of handicapped and aged persons.

An important duty of the local health authority is health education. Posters, films and lectures all help to educate the general public in healthy living and doctors, health visitors, midwives and home nurses give health education to the individual both by their teaching and example.

The services of voluntary organizations are used to provide many of the services required of the local authority and they may be grant-aided for this purpose.

Chapter 18

International Medicine and Health

It is necessary for all who do medical, nursing or health work to-day to have some knowledge of its international features. There are several reasons for this.

Travel and transport are now both rapid and in common use by millions. Air travel carries people and goods across oceans and continents in a few hours. Modern roads and vehicles also enable many countries to be traversed in a matter of hours or days. Even passage across the sea by ship is faster. This immense and rapid movement of people and goods over the whole surface of the world also means that disease travels with equal ease and swiftness.

The doctor and the nurse must remember these facts when seeing a sick person who has been travelling. He may be suffering from a disease contracted in another country. In England it is now not uncommon for patients who have recently arrived from overseas to suffer from malaria, dysentery, enteric fever, or parasitic diseases. Thus today the so-called tropical diseases may be the cause of illness in patients examined in colder countries. Many an unfortunate patient suffering from one or other of these diseases on return to his country from overseas has not had his condition diagnosed and has died.

Many such diseases brought in by patients or carriers may spread and even cause epidemics. Enteric patients or carriers, if not diagnosed and if preventive measures are not taken early, may be the means of infecting water or milk supplies. Smallpox is one of the diseases frequently spread by travellers who have not been vaccinated. As it is such an extremely infectious disease, on enter-

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ing a country or community which has neglected to keep a high level of immunity by vaccination, it soon spreads rapidly.

For many centuries man has feared the great epidemics which passed from one country to another, and has tried to prevent them. In earlier times very drastic measures were taken for this purpose. Unfortunate sufferers of such diseases as leprosy, smallpox, typhus or plague, or diseases which seemed to be like these, were frequently thrown out of their towns or villages to starve, or were shut up in terrible, insanitary, neglected lazarettes.

Last century, the fear of cholera and plague spreading along the trade routes from Asia through the Middle East to Europe, led to another type of arbitrary control. Travellers and their ships were strictly quarantined. This meant they were isolated and kept from having any contact with the shore. In many cases goods on board were burnt, being suspected of carrying infection.

However, such drastic quarantine measures did not stop diseases spreading around most parts of the world. Such outbreaks were known as pandemics, of which the devastations of cholera and plague last century and influenza in 1918 were the great examples.

An effort was then made to find a better means to prevent the spread of disease through travel and transport, and also to reduce the damage done by drastic quarantine and by destruction of cargoes to trade and travellers. The nations of Europe prepared International Agreements which led eventually to the Health Organization of the League of Nations, and finally to the World Health Organization of today.

THE WORLD HEALTH ORGANIZATION

The World Health Organization (W.H.O.) is a member of the family of the United Nations. The governments of the world have established it to carry on international medical and health work. It has an annual World Health Assembly, an Executive Board, and a world-wide service, with headquarters in Geneva and six regional offices in Copenhagen, Brazzaville, Alexandria, New Delhi, Manila and Washington.

International Medicine and Health

W.H.O. does work in two main fields. Firstly it gives assistance to all countries asking for guidance or help in setting up health or medical departments, hospitals, preventive disease services or research programmes. For this purpose it sends out consultants, advisers and demonstration teams to countries everywhere.

Very large numbers of nurses go out to help these programmes. For example, nurses go to such countries as India to help set up maternal clinics, expand hospitals, or to introduce rural nursing and health services. Others go to countries in Latin America or Africa for similar international programmes. The nurses who work in these country projects for W.H.O. are recruited from many lands. A large number come from the United Kingdom. Such nurses leave their own home posts only temporarily for a few weeks to two years.

The second type of work which W.H.O. undertakes is to help forward the general scientific and technical study of medical and similar subjects. It arranges conferences, gives a large number of fellowships for advanced training, publishes medical journals, assists research, and arranges a variety of meetings of experts. Again, many nursing subjects are included in this general technical and scientific programme. Expert groups have produced useful reports on the training of nurses, the midwifery course, etc. Many nurses have been awarded W.H.O. fellowships.

The publications of W.H.O. are especially valuable. Perhaps the most important for most countries are those dealing with the statistics of diseases and deaths in all countries of the world. Allied to these reports are the regular notices sent out by radio and air-mail of the occurrences of the very infectious, previously called the pestilential diseases, i.e. cholera, plague, yellow fever, smallpox and typhus.

W.H.O. is also important for doctors, nurses and pharmacists for the scientific work it does in standardizing the purity and strength of drugs, antibiotics and vaccines.

OTHER UNITED NATIONS ORGANIZATIONS

In the official inter-governmental family of the United Nations there are:

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- (1) The United Nations Children Fund, which, associated with W.H.O., does much work in countries on request, to deal with malnutrition, child disabilities, and general disease.
- (2) The Food and Agricultural Organization, which includes such health problems as malnutrition, dietetics, and food standards in its programmes.
- (3) The International Labour Organization, which enters the medical field with its interest in factory hygiene, occupational disease, and industrial health.

NON-GOVERNMENTAL ORGANIZATIONS

It must be remembered that W.H.O., powerful though it is, is not the only international organization working in medicine and health. There are the large number of non-governmental organizations. In medicine the leading member of this group is the *World Medical Association*, which has been formed by the doctors of the world. There are now about sixty national medical associations joined together to do international medicine through this Association.

Nurses have their own non-governmental organizations. The oldest of these is the International Council of Nurses, which has headquarters in London but will move to Geneva shortly. It has extended the interest of nurses in world conditions, and has helped W.H.O. in a number of international nursing studies. Another important body is the *International Confederation of Midwives*.

There are other international bodies of importance to medicine and health in the voluntary field. Best known, of course, is the *Red Cross*. Not every doctor and nurse realizes that there are two international Red Cross bodies. The first, and especially significant because of its part in protecting the rights of medical and health personnel in wartime and the rights of prisoners of war, is the *International Red Cross* with headquarters in Geneva. It established the Geneva Conventions for these purposes, and sends observers into the countries of both sides during wartime.

The second Red Cross movement is the *League of Red Cross*

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Societies. Nearly every country has some such society. The Moslem countries have corresponding Red Crescent Societies. These national Red Cross and similar societies undertake a wide range of first-aid services, voluntary nursing, blood transfusion, and health educational work. Internationally, through their joint headquarters, also in Geneva, they provide much of the medical and nursing aid which is rushed to the scenes of national catastrophes such as earthquakes, floods, and epidemics. The teams which do this emergency work are recruited from national societies.

The above groups are those of most direct interest in international medicine and health, but there is a rapidly growing number of both official and voluntary organizations playing some part in welfare or relief which should be known to doctors and nurses.

In the voluntary, non-official group are such other bodies, interested in the various specialized medical subjects, as:

The World Federation of Mental Health

The International Dental and Hospital Federations, and
the International Unions against Tuberculosis, Cancer,
and the Venereal Diseases

A further non-official group with a long, proud history of work in international medicine, includes the missionary medical societies which pioneered the introduction of scientific medicine into Asia and Africa. Though much missionary work has ceased with the creation by the newer nations of their own services, mission societies still have many hospitals and clinics overseas where doctors and nurses do fine, selfless work.

Important contributions to non-official work in medicine and health have been the great foundations, especially those of the United States of America. The best known has been the pioneer, the Rockefeller Foundation. Its work in controlling tropical diseases, and in medical education and research has been one of the great forces spreading modern medicine to all continents. It has been followed by many others of which the Nuffield Foundation of Great Britain is now a famous member.

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AN INTERNATIONAL AGE

This is the age of immense international aid programmes, which are producing many new doctors and nurses in all countries and giving them modern medicine and health. Death and disease rates are falling, and conversely population is growing, particularly in the newer lands of Asia, Africa and Latin America.

The world is now truly one in the nature of disease, the quest for health, and the vast joint programmes in medicine and health organized by governments and voluntary groups. No doctor or nurse can ignore this great happening. The diseases of any country may appear to test the doctor in his skill in diagnosis or the nurse in her art of nursing. He and she may be called upon or wish to serve too in other countries.

In this book therefore, it has been felt necessary to consider personal and community health as something broader and more important than that limited to any one country. No nurse today can consider herself fully prepared in her calling unless she has this broader outlook.

Appendix A

CAUSES OF DEATH. 1715 LONDON

From a general BILL of all Chriftenings and Burials
from the 14th December 1714 to the 13th December 1715.
According to report made to the King's Most Excellent
Majefty by the Company of Parifh Clerks of LONDON & C.

Diseases and Casualties

Abortive	68	Gout	25	Rupture	10
Aged	1,931	Gravel	3	St. Anthony's Fire	1
Ague	8	Grief	5	Salvation	1
Apoplexy	73	Gripping of the guts	589	Scald Head	1
Asthma	46	Headmould/hot	38	Small Pox	1,057
Bedridden	5	Hooping Cough	7	Sores and Ulcers	31
Bleeding	5	Horfhothead	3	Spleen	1
Bloody Flux	19	Impofitume	48	Spotted Fever	161
Burthen	5	Infants	6	Stillborn	463
Cancer	65	Inflammation	1	Stone	35
Cholera	6	Jaundies	80	Stoppage in the Stomach	186
Childbed	275	Leprosy	1	Strangury	2
Chrofmes	46	Leihargy	5	Strangullion	1
Colick	63	Livergrown	3	Suddenly	85
Consumption	2,842	Loofnefs	12	Surfet	13
Convulfion	6,818	Lumattick	21	Tooth	1,276
Cough	5	Meafles	30	Thrift	67
Diabetes	2	Mortification	117	Tiffick	271
Drofly	789	Palfy	27	Twifing of the Guts	10
Evil	52	Pleurify	41	Tympany	15
Fever	3,588	Purples	27	Vapours	1
Fiftula	15	Quinfy	9	Vomiting	25
Flux	4	Rafh	12	Water in the Head	25
French Pox	82	Rheumatifm	22	Wind	1
Gangrene	6	Ricketz	161	Worms	4
		Rifing of the Lights	51		

Casualties

Broken Leg	3	Found Dead	29	Made away themfelves	28
Brufed	2	Frightened	1	Murdered	11
Drowned	59	Killed by feveral accidents	55	Overlaid	47
Exceffive Drinking	4	Killed by a fword	3	Planet-Struck	1
Executed	17			Wounded	5

Buried in all 22,232.

In 1725 in addition to the difeases of 1715 were added deaths from:

Itch	3	and to casualties:		Exceffive Fat	
Megrims	1	Broken Skull	1	Overlaid	7
Mifcarriage	3	Burnt	2	Preſ'd to Death in a Crowd	
Scurvy	3	Died for Want	1	Stabbed	2
Swelling in the Throat	1	Scalded	1	Strangled	

Appendix B

Population of England and Wales (in thousands)

Year	Males	Females	Persons	
1901	15,729	16,799	32,528	Census
1941	20,141	21,607	41,748	Mid-year total population
1951	21,044	22,771	43,815	} Mid-year home population
1961	22,353	23,852	46,205	
1962	22,660	24,049	46,709	
1963	22,832	24,191	47,023	

Appendix C

1900

Causes of death in the City of London

Smallpox	2
Measles	1,946
Scarlet Fever	329
Diphtheria	1,593
Whooping Cough	1,957
Typhus	2
Enteric Fever	767
Simple and ill defined fever	6
Diarrhoea and dysentery	3,715
Cholera	74
Cancer	4,348
Tabes Mesenterica	811
Phthisis	7,748
Other Tubercular and Scrofulous diseases	2,339
Diseases of nervous systems	7,355
Diseases of circulatory systems	7,067
Diseases of respiratory system	17,244
Diseases of Digestive system	5,637
Diseases of Urinary system	2,608
Diseases of generative system	236
Puerperal Fever	197
Childbirth	235
Violence	3,573
All other causes	14,745
TOTAL	84,534

Appendix D *England and Wales*

Births and deaths, stillbirths and infant mortality since 1941

	Live births		Stillbirths	Deaths		
	Number annually	Per 1,000 population	Per 1,000 total births	Number annually	Per 1,000 population	Infant mortality rate per 1,000 live births
1941-45	669,269	15.9	30.5	499,403	12.8	49.8
1946-50	780,933	18.0	24.0	500,128	11.8	36.4
1951-55	675,420	15.3	23.0	514,231	11.7	26.9
1956-60	739,587	16.4	21.4	523,393	11.6	22.6
1960	785,005	17.2	19.8	526,268	11.5	21.8
1961	811,281	17.6	19.0	551,752	11.9	21.4
1962	838,736	18.0	18.1	557,636	11.9	21.7
1963 (p)	854,055	18.2	17.2	572,868	12.2	21.1

NOTE: Live birth rates for 1941-49 are based on total population, i.e., including armed forces and mercantile marine at home and abroad. For all other years they are based on home population.

Deaths include those of non-civilians registered in England and Wales.

Death rates are for civilians only until the end of 1949. For all other years they are based on home population.

Infant mortality is based on related births prior to 1957.

Appendix E MATERNAL MORTALITY

Outcome of pregnancies: England and Wales

Year	Total (live and still) births	Maternal mortality from childbearing				Maternal mortality from abortion			
		Deaths	Death rate per 1,000 births			Deaths	Rate per 1,000 births	Rate per million women aged 15-44	
			Infec- tions (640, 641, 681, 682, 684)	Others	Total			Septic (651)	Other (650, 552)
1953	700,053	419	0.09	0.50	0.60	76	0.11	4	4
1959	764,402	243	0.06	0.26	0.32	47	0.06	3	2
1960	800,824	248	0.04	0.27	0.31	62	0.08	3	3
1961	827,008	220	0.04	0.23	0.27	54	0.07	4	2
1962	854,200	242	0.05	0.23	0.28	57	0.07	3	3
1963	869,044	194	0.03	0.19	0.22	49	0.06	3	2

Appendix F

Principal causes of death, England and Wales

Cause of death	Average 1951-1953	1961	1962	1963
Tuberculosis, respiratory	9,760	3,002	2,774	2,609
Tuberculosis, other forms	1,338	332	314	351
Syphilis	1,376	900	822	820
Typhoid and paratyphoid fever ..	13	2	7	5
Dysentery	49	34	28	35
Scarlet fever	9	3	2	2
Diphtheria	24	10	2	2
Whooping cough	292	27	24	36
Meningococcal infections	293	130	138	146
Acute poliomyelitis	262	59	18	7
Smallpox	6	..	26	..
Measles	233	152	39	127
Other infective and parasitic diseases	1,141	988	977	887
Malignant neoplasms:				
Stomach	14,384	13,788	13,596	13,681
Lung and bronchus	14,148	22,810	23,779	24,434
Breast	8,180	9,367	9,430	9,512
Uterus	3,992	3,981	4,015	3,969
Leukaemia and aleukaemia	2,030	2,645	2,707	2,830
Other malignant neoplasms	44,481	47,324	48,081	47,990
 Diabetes mellitus	3,412	3,869	3,811	3,804
Vascular lesions affecting central nervous system	68,634	77,023	78,297	80,340
Arteriosclerotic heart disease, including coronary disease	61,483	95,775	102,478	107,856
Influenza	8,008	7,102	3,308	3,214
Pneumonia	21,573	29,979	31,672	36,741
 Bronchitis	31,923	31,363	33,293	35,332
Ulcer of stomach and duodenum ..	5,380	4,405	4,692	4,341
Gastro-enteritis	2,576	2,645	2,619	2,662
 Nephritis and nephrosis	5,765	3,498	3,423	3,179
Hyperplasia of prostate	4,359	3,075	2,901	2,479
Complications of pregnancy, childbirth and puerperium	495	274	299	243
Congenital malformations	4,448	5,196	5,426	5,249
 All other diseases	177,257	158,680	154,741	155,362
 Motor vehicle accidents	4,334	6,634	6,306	6,351
Accidental poisoning	282	464	573	672
Suicide	4,520	5,201	5,589	5,715
 All other accidents and violence ..	10,338	11,015	11,429	11,885
 ALL CAUSES	516,798	551,752	557,636	572,868

Appendix G

INFANT MORTALITY

England and Wales: infant mortality by age and legitimacy, 1958 to 1963

	Deaths per 1,000 live births					
	1958	1959	1960	1961	1962	1963
ALL CAUSES						
ALL INFANTS:						
Under 4 weeks ..	16.2	15.9	15.5	15.3	15.1	14.3
4 weeks-3 months ..	2.6	2.4	2.5	2.4	2.5	2.7
3-6 months	2.1	2.1	2.1	2.0	2.3	2.4
6-12 months.. ..	1.7	1.8	1.6	1.7	1.8	1.8
Total under 1 year	22.5	22.2	21.8	21.4	21.7	21.1
ALL MALE INFANTS:						
Under 4 weeks ..	18.3	17.7	17.8	17.4	17.3	16.2
4 weeks-3 months ..	2.8	2.7	2.8	2.7	2.8	3.0
3-6 months	2.3	2.3	2.2	2.1	2.6	2.6
6-12 months.. ..	1.9	1.9	1.7	1.7	1.8	1.9
Total under 1 year	25.3	24.5	24.5	23.9	24.5	23.7
ALL FEMALE INFANTS:						
Under 4 weeks ..	13.8	14.0	13.2	13.2	12.8	12.2
4 weeks-3 months ..	2.3	2.1	2.3	2.1	2.2	2.3
3-6 months	1.9	2.0	1.9	1.9	2.0	2.2
6-12 months.. ..	1.6	1.7	1.5	1.7	1.7	1.7
Total under 1 year	19.6	19.8	18.9	18.9	18.7	18.4
ILLEGITIMATE INFANTS:						
Under 4 weeks ..	20.6	20.7	19.5	19.5	20.4	19.2
4 weeks-3 months ..	3.7	2.7	3.0	2.4	2.9	3.1
3-6 months	2.1	2.4	2.4	2.1	2.4	2.3
6-12 months.. ..	1.4	1.6	1.5	1.3	1.5	1.4
Total under 1 year	27.8	27.4	26.4	25.3	27.2	26.0
LEGITIMATE INFANTS:						
Under 4 weeks ..	15.9	15.6	15.3	15.1	14.7	13.8
4 weeks-3 months ..	2.5	2.4	2.5	2.4	2.5	2.7
3-6 months	2.1	2.1	2.1	2.0	2.3	2.4
6-12 months.. ..	1.7	1.8	1.6	1.7	1.8	1.8
Total under 1 year	22.3	21.9	21.5	21.2	21.3	20.8

Appendix H

England and Wales: causes of infant mortality; death rate per 100,000 live births

Cause of death	1953	1959	1960	1961	1962	1963
Whooping cough..	24.4	2.1	3.3	2.3	2.1	3.4
Tuberculosis..	9.2	2.0	1.3	1.5	0.72	0.47
Measles..	8.3	3.1	0.76	3.6	0.48	2.8
Convulsions..	2.3	0.53	0.25	1.0	0.48	0.47
Bronchitis and pneumonia	492	349	353	324	360	389
Gastro-enteritis	97.2	40.2	43.7	47.7	53.7	46.5
Congenital malformations..	429	454	452	444	458	420
Immaturity ..	518	385	391	373	356	334
Immaturity mentioned as associated condition	412	441	425	434	414	398
Injury at birth	268	247	232	252	222	228
Asphyxia and atelectasis	364	362	341	326	319	294
Haemolytic disease	59.6	48.1	47.4	41.2	42.1	40.0
Accidental suffocation	29.5	18.7	17.1	14.5	19.1	17.0
Other causes	376	310	297	313	336	338
ALL CAUSES	2,677	2,222	2,181	2,144	2,168	2,113

Appendix I

England and Wales: causes of neonatal mortality
Death rate at ages under 4 weeks per 100,000 live births

Cause	1953	1959	1960	1961	1962	1963
All infective and parasitic diseases	5	3	2	2	3	2
Bronchitis	6	3	4	3	4	2
Pneumonia	130	100	93	87	91	80
Diarrhoea	9	6	6	8	7	7
Immaturity	508	381	386	368	351	331
Congenital malformations ..	267	284	287	280	296	272
Asphyxia and atelectasis ..	359	359	338	323	316	291
Congenital debility and ill-defined causes	30	39	48	54	55	59
Other causes	453	412	389	409	387	381
ALL CAUSES	1,766	1,587	1,553	1,534	1,509	1,425

Appendix J

England and Wales: infant and child mortality 1936-1963

	Stillbirths and deaths under 1 week Perinatal mortality	Under 4 weeks	Under 1 year	1 year	2 years	3 years	4 years
	per 1,000 total births	per 1,000 live births*	Death rate per 1,000 living				
1936-40	59.2	29.2	55.3	8.66	4.23	3.13	2.68
1941-45	48.6	26.0	49.8	5.85	3.21	2.60	2.18
1946-50	39.8	21.1	36.3	2.99	1.64	1.25	1.05
1951-55	37.6	18.0	26.9	1.95	1.15	0.85	0.67
1956-60	34.9	16.2	22.6	1.45	0.89	0.69	0.57
1959	34.1	15.9	22.2	1.44	0.87	0.71	0.56
1960	32.8	15.5	21.8	1.38	0.87	0.64	0.52
1961	32.0	15.3	21.4	1.50	0.95	0.65	0.55
1962	30.8	15.1	21.7	1.37	0.82	0.66	0.54
1963	29.3	14.3	21.1	1.48	0.85	0.65	0.59

* Based on related live births prior to 1957.

Appendix K

SCHOOL CHILDREN

RECORDED INCIDENCE OF CERTAIN DEFECTS AND DISEASES IN 1963 COMPARED WITH THE RECORDED INCIDENCE IN 1960
REQUIRING TREATMENT

Defect	1960: 2,112,353				Periodic Inspections				1963: 2,010,215		Special Inspections 1960: 701,759 1963: 665,614		Total Number of Defects
	Number of Defects				Total (including all other age groups inspected)				Incidence per 1,000 inspections		Number of Defects		
	Entrants		Leavers		1960		1963		1960	1963	1960	1963	
	1960	1963	1960	1963	1960	1963	1960	1963	1960	1963	1960	1963	
	1960	1963	1960	1963	1960	1963	1960	1963	1960	1963	1960	1963	
...	6,751	6,685	11,166	10,549	31,165	28,523	14.8	14.2	71,266	70,745	102,431	99,268	
Skin ...	17,313	19,903	52,927	51,832	141,236	136,322	66.9	67.8	63,419	56,742	204,655	193,064	
Eyes—Vision ...	11,259	10,839	2,912	2,553	23,236	21,330	11.1	10.7	9,217	8,075	33,301	29,301	
Squint ...	1,950	1,772	1,866	1,255	7,316	5,330	3.5	2.7	14,431	10,575	21,747	15,905	
Other ...	3,705	5,620	1,931	2,048	9,938	12,411	4.7	6.2	9,146	10,956	19,084	23,407	
Ears—Hearing ...	2,615	2,804	1,355	1,264	6,293	5,959	3.0	3.0	4,497	3,247	10,790	9,206	
Otitis Media ...	1,727	1,700	1,909	1,603	6,356	5,278	3.0	2.6	10,789	8,089	27,935	13,367	
Other ...	19,376	17,460	3,799	3,420	35,574	30,118	16.8	15.0	22,631	15,991	58,265	46,109	
Nose and Throat ...	5,572	5,712	721	722	10,200	9,913	4.8	4.9	7,884	6,069	18,084	16,002	
Speech ...	1,281	1,333	178	178	2,111	2,093	1.0	1.0	1,549	1,585	3,960	2,768	
Lymphatic Glands ...	1,358	1,662	1,219	1,060	1,137	1,127	0.5	0.5	1,679	1,325	3,796	3,432	
Heart ...	5,044	5,372	1,685	1,655	11,337	11,029	5.4	5.4	5,608	4,405	17,565	15,885	
Lungs ...	1,133	1,233	1,261	1,202	2,622	2,645	1.2	1.2	1,949	2,064	8,370	8,519	
Developmental—Hernia ...	2,606	1,509	1,397	1,201	6,621	7,677	3.1	3.2	2,734	2,010	13,284	9,687	
Other ...	9,944	9,388	3,975	3,777	28,489	23,642	13.5	11.8	7,734	6,914	36,487	30,556	
Orthopedic—Posture ...	5,928	4,814	4,392	3,777	17,815	13,919	8.4	6.9	10,837	7,591	28,652	21,310	
Feet ...	551	660	537	580	2,119	2,313	1.0	1.2	1,568	1,694	4,290	4,670	
Other ...	810	1,020	330	561	2,722	2,976	1.3	1.5	5,335	5,667	12,251	12,678	
Nervous System—Epilepsy ...	1,032	1,112	1,265	1,380	6,916	7,011	3.3	3.5	5,603	5,791	13,554	11,258	
Other ...	1,569	1,950	641	670	4,751	5,467	2.2	2.7	5,603	5,791	13,554	11,258	
Psychological—Development ...	1,836	1,082	551	676	2,554	3,086	1.2	1.5	1,440	1,270	3,994	4,356	
Stability ...	5,589	4,873	4,198	4,049	18,947	16,439	9.0	8.2	108,622	73,509	127,569	89,948	

Appendix L

INFECTIOUS DISEASES

England and Wales: notifications of infectious diseases

	Number originally notified				Number after correction of diagnosis			
	1960	1961	1962	1963	1960	1961	1962	1963
Anthrax	*	9	9	14	*	8	8	14
Continued and relapsing fevers	1	1	0	0	1	0	0	0
Diphtheria	157	177	70	48	49	51	16	33
Dysentery	48,313	23,390	34,171	36,215	43,268	20,412	30,889	31,731
Acute encephalitis (infective)	143	124	111	135	144	118	113	125
Acute encephalitis (post-infectious)	118	157	121	166	116	158	119	165
Acute encephalitis	2,981	2,250	1,788	1,751	2,954	2,237	1,789	1,739
Erysipelas	10,540	10,904	7,505	9,126	7,732	7,833	5,150	5,856
Food poisoning .. .. .	..	..	..	1	..	..	..	1
Malaria (contracted at home)	159,536	763,857	184,716	601,473	159,315	763,465	184,757	601,111
Measles	998	953	844	698	630	651	575	606
Meningococcal infection	1,076	939	1,027	977	1,063	932	1,017	970
Ophthalmia neonatorum	247	278	138	356	239	251	118	340
Paratyphoid fevers	14,925	18,807	12,793	14,238	14,543	18,452	12,529	14,170
Pneumonia (acute primary and influenza)	323	338	260	65	257	705	211	39
Acute poliomyelitis (paralytic)	217	256	80	21	121	169	59	12
Acute poliomyelitis (non-paralytic)	8,909	8,327	7,191	6,562	8,896	8,337	7,148	6,486
Puerperal pyrexia	32,332	20,127	15,417	17,522	32,166	19,984	1,333	17,437
Scarlet fever	2	1	66	..	1	1	63	..
Smallpox	105	106	127	257	89	93	127	242
Typhoid fever .. .. .	..	..	..	3	..	..	..	2
Typhus fever (scrub typhus) .. .. .	..	..	..	..	..	..	..	..
Whooping cough	58,217	24,562	8,406	34,843	58,030	24,469	8,347	34,736

* Not notifiable prior to 1st December, 1960.

Appendix M

NOTIFICATIONS OF INFECTIOUS DISEASES

Total corrected notifications by sex and age, excluding Port Health Districts, 1963:
England and Wales

	Age						Unstated	All ages
	0-	1-	3-	5-	10-	15-	25 and over	
Scarlet fever	47	724	1,856	4,774	905	328	95	8,757
Whooping cough	57	678	1,776	4,713	1,012	288	129	8,680
Diphtheria	2,013	4,381	3,814	5,125	793	104	143	16,427
Measles	2,104	4,599	4,276	5,936	896	201	233	18,309
Acute poliomyelitis, paralytic and non-paralytic	0	1	4	0	0	0	7	22
Dysentery	0	0	0	6	3	0	1	11
Meningococcal infection	10,467	72,513	83,155	128,175	8,172	2,188	940	306,650
	10,604	69,041	80,158	121,847	8,176	2,388	1,228	294,461
	1	8	4	8	2	2	9	34
	704	2,471	2,078	4,553	1,639	918	2,966	15,536
	645	2,066	1,759	4,170	1,315	1,529	4,434	16,195
	101	87	41	41	29	33	33	368
	65	46	23	29	14	23	37	238
	0-	1-	3-	5-	10-	15-	25 and over	All ages
Typhoid and paratyphoid fevers	33	65	139	42	4	5	238	Unstated
Acute pneumonia	33	60	141	39	17	4	294	Unstated
Erysipelas	1,327	772	1,463	2,245	1,761	80	7,648	Unstated
	1,055	623	1,245	1,528	2,004	67	6,522	Unstated
	15	26	160	380	170	10	761	Unstated
	12	17	188	451	290	20	978	Unstated

Appendix N

PATTERN OF IMMUNISATION OF CHILDREN AGAINST INFECTIOUS DISEASES

Modified Schedules incorporating poliomyelitis vaccine (oral)

SCHEDULE P (Modified)

Age	Visit	Vaccine	Injection	Interval
1 to 6 months	1	Diphtheria, Tetanus, Pertussis	1	4-6 weeks
	2	Diphtheria, Tetanus, Pertussis	2	4-6 weeks
	3	Diphtheria, Tetanus, Pertussis	3	
7 to 11 months	4	Poliomyelitis (oral)	—	4-8 weeks
	5	Poliomyelitis (oral)	—	4-8 weeks
	6	Poliomyelitis (oral)	—	
18 to 21 months	7	Diphtheria, Tetanus, Pertussis	4	
Smallpox during the first 2 years, preferably in the second year (see Note a)				
School entry		Diphtheria and Tetanus		
8 to 12 years		Diphtheria and Tetanus		
		Smallpox re-vaccination		
Over 12 years		B.C.G. (see Note c)		

SCHEDULE Q (Modified)

Age	Visit	Vaccine	Injection	Interval
6 to 10 months	1	Poliomyelitis (oral)	—	4-8 weeks
	2	Poliomyelitis (oral)	—	4-8 weeks
	3	Poliomyelitis (oral)	—	
11 to 13 months	4	Diphtheria, Tetanus, Pertussis	1	
	5	Diphtheria, Tetanus, Pertussis	2	4-6 weeks
	6	Diphtheria, Tetanus, Pertussis	3	
Smallpox during the first 2 years, preferably in the second year (see Note a)				
School entry		Diphtheria and Tetanus		
8 to 12 years		Diphtheria and Tetanus		
		Smallpox re-vaccination		
Over 12 years		B.C.G. (see Note c)		

The schedules are revised from time to time in accord with new developments. An interval of at least two weeks should normally be allowed to elapse after an injection of Diphtheria/Tetanus/Pertussis vaccine before undertaking vaccination against smallpox. When vaccination against smallpox precedes an injection of one of the other vaccines it is desirable to allow at least three weeks to elapse.

It is advisable to allow an interval of three weeks after any dose of oral poliomyelitis vaccine before any other immunizing procedure is undertaken.

B.C.G. vaccine may be given to school children aged 10 years or more at the discretion of the Medical Officer of Health.

Appendix O

INCUBATION AND EXCLUSION PERIODS OF THE COMMONER INFECTIOUS DISEASES

	Usual incubation period (days)	Interval between onset and appearance of rash (days)	PERIOD OF EXCLUSION	
			PATIENTS	Contact, i.e. the other members of the family or household living together as a family, that is, in one tenement.
SCARLET FEVER (and streptococcal sore throat)	2-5	1-2	7 days after discharge from hospital or from home isolation. (Unless "cold in the head", discharge from the nose or ear, sore throat, or septic spots be present.)	Children—no exclusion. Persons engaged in the preparation or service of school meals to be excluded until Medical Officer of Health certifies that they may resume work. (See last part of paragraph 37.)
DIPHTHERIA	2-5	—	Until pronounced by a medical practitioner to be fit and free from infection.	At least 7 days. Return to school should not be permitted until bacteriological examination has proved negative.
MEASLES	10-15	3-4	10 days after the appearance of the rash if child appears well.	Children under 5 years of age should be excluded for 14 days from the date of appearance of the rash in the last case in the house. Other contacts can attend school. Any contact suffering from a cough, cold, chill or red eyes should be immediately excluded. A child who is known with certainty to have had the disease need not be excluded.
GERMAN MEASLES	14-21	0-2	7 days from the appearance of the rash	None.

INCUBATION AND EXCLUSION PERIODS—(cont.)

	Usual incubation period (days)	Interval between onset and appearance of rash (days)	PERIOD OF EXCLUSION	
			PATIENTS	Contacts; i.e. the other members of the family or household living together as a family, that is, in one tenement.
WHOOPING COUGH	7—10	—	28 days from the beginning of the characteristic cough.	Children under 7 years of age should be excluded for 21 days from the date of onset of the disease in the last case in the house. A child who is known with certainty to have had the disease need not be excluded.
MUMPS	12—28	—	7 days from the subsidence of all swelling.	None.
CHICKEN POX	11—21	0—2	14 days from the date of appearance of the rash.	None.
POLIOMYELITIS ENCEPHALITIS MENINGOCOCCAL INFECTION	7—14 4—30 2—10	— — —	(At least 6 weeks. Will usually require a much longer period for recovery.	At least 21 days

Appendix P

AGE OF MARRIAGE IN ENGLAND AND WALES

Males													
Under 21 years	22,430	23,475	28,016	30,844	33,443	36,364	37,401	40,160	42,769	45,153			
21-24	131,631	132,632	139,439	139,382	138,107	138,248	139,839	141,460	142,537	141,506			
25-29	93,482	91,768	95,266	97,172	88,464	83,509	81,460	81,400	81,389	81,569			
30-34	37,518	36,737	36,205	33,852	32,113	29,559	29,001	28,190	28,296	28,077			
35-44	29,600	27,245	28,492	27,107	25,959	24,335	23,961	23,669	23,692	23,673			
45-54	15,269	15,122	15,346	14,661	14,020	13,440	13,289	13,391	12,972	12,817			
55 and over	14,182	13,835	14,299	14,113	14,022	13,730	14,417	14,713	15,023	14,937			
Age not stated ⁽¹⁾	886	867	855	813	775	728	758	631					
Females													
Under 21 years	93,544	97,601	108,464	113,494	116,453	119,585	120,838	125,096	130,400	136,317			
21-24	128,944	126,140	129,658	125,952	123,369	119,918	121,110	121,417	120,330	116,301			
25-29	53,755	51,921	52,224	49,611	46,120	43,029	41,070	40,291	39,909	39,528			
30-34	24,213	23,249	23,036	20,814	19,217	17,502	17,031	16,637	16,637	16,485			
35-44	22,893	21,378	22,185	21,353	20,352	19,011	18,580	18,400	17,962	18,190			
45-54	12,863	12,666	13,143	12,595	12,272	11,736	11,913	11,981	12,027	11,693			
55 and over	7,812	7,852	8,267	8,237	8,298	8,368	8,783	9,100	9,565	9,656			
Age not stated ⁽¹⁾	974	924	941	888	822	764	801	692					

Sources: Registrars General

⁽¹⁾ From 1961 an assumed distribution of 'Age not stated' figures for England and Wales is included in the analysis above.

Appendix Q (a)

Expenditure of local authorities other than out of loans for capital works

England and Wales
Years ended 31 March

£ thousand

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62
Total	1,062,263	1,127,517	1,225,337	1,330,779	1,497,088	1,630,152	1,731,287	1,865,718	2,018,451	2,232,254
Education.....	345,392	364,475	409,060	451,253	527,075	587,039	633,900	696,799	752,438	830,682
Public libraries.....	10,698	11,230	12,096	13,213	15,055	16,476	17,696	19,584	21,799	24,144
Individual health(*)	42,904	43,016	45,137	49,120	54,070	57,843	61,659	68,084	73,484	81,290
Public health:.....										
Sewerage and sewage disposal	20,848	22,169	23,739	25,813	29,829	33,404	36,710	39,975	43,902	49,186
House and trade refuse	26,189	26,903	27,987	30,844	33,603	35,302	36,855	38,100	40,970	45,245
Baths, washhouses and open bathing places	6,253	6,579	6,696	7,375	8,315	8,831	9,080	9,431	9,809	11,030
Parks, pleasure grounds and open spaces.....	16,898	17,578	18,530	20,359	22,296	24,146	26,258	27,135	28,929	30,715
Other items	10,597	11,269	11,526	12,688	14,260	15,439	16,602	17,703	18,549	20,754
National assistance—accommodation and welfare	19,436	21,325	22,895	25,026	28,013	30,457	33,092	35,555	38,908	43,568
Child welfare and child life protection.....	16,031	16,619	17,032	17,609	18,548	19,909	20,780	21,714	23,175	25,311
Housing (including small dwellings acquisition).....	122,229	143,359	163,700	197,972	221,858	244,850	263,748	279,147	301,194	332,653
Almendale and Hill Buildings	3,037	3,021	3,206	3,257	3,401	3,606	3,663	3,854	4,058	4,026
Lundragate River Conservancy, etc. and coast protection.....	7,789	13,870	9,554	9,307	9,581	10,492	11,399	12,160	13,050	14,556
Highways and bridges	74,421	77,828	84,565	90,288	96,361	103,869	105,672	112,812	119,853	133,715
Private street works and other works of Private Improvement.....	4,292	4,485	4,809	5,745	6,785	6,317	6,758	7,253	7,896	8,770
Public lighting.....	10,960	11,680	12,188	13,380	14,746	15,690	16,842	17,620	18,634	19,899
Fire service.....	17,926	18,623	19,092	20,365	22,732	24,068	25,542	27,125	29,199	32,005
Police	66,301	69,149	71,815	78,842	91,624	95,152	102,630	108,209	122,210	136,829
Administration of justice	5,776	6,189	6,567	6,916	7,800	8,568	9,158	10,280	11,903	13,779
Trading services:										
Water supply	40,986	44,039	45,830	49,873	53,677	58,690	60,445	63,772	67,663	71,985
Passenger transport	6,266	6,208	6,285	6,612	7,049	7,355	7,503	7,612	7,836	8,216
Harbours, docks, piers, etc.	4,855	4,934	5,176	5,714	6,297	6,758	7,223	7,612	8,026	8,749
Other trading services (including corporation estates, ferries, markets and civil restaurants)	29,519	32,901	33,504	37,233	38,280	40,295	41,171	43,792	45,758	48,248
Civil defence	19,640	19,932	21,267	22,494	24,323	25,609	27,257	28,275	30,630	33,579
Emergency services other than civil defence	3,311	3,542	3,553	3,603	3,977	4,350	4,701	5,056	5,591	6,214
Other works and purposes	15,598	14,754	13,025	34,234	36,871	39,507	42,591	43,950	46,033	48,581
Expenditure not allocated to specified services.....	28,746	31,127	30,281	32,044	38,242	39,930	35,822	44,598	57,100	73,905

(*) Local authority health services for example, care of mothers and young children, health visiting, ambulances, etc.

Source: Ministry of Housing and Local Government

Appendix Q (b)

Expenditure of local authorities on capital works

England and Wales
Years ended 31 March

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1962/61	1961/62
Total	497,772	543,641	525,737	541,052	555,041	528,585	511,896	571,472	620,754	741,218
Education	58,010	58,714	60,102	68,803	86,042	96,288	92,028	89,178	88,225	110,965
Public libraries and museums	324	309	421	624	717	624	754	1,528	2,116	2,398
Public health	1,495	1,380	1,484	1,538	1,332	1,220	1,424	2,276	3,264	4,540
Sewerage and sewage disposal	17,611	18,945	19,512	23,743	26,501	27,250	28,333	35,227	37,021	46,373
House and trade refuse	680	794	694	1,041	1,315	1,411	977	1,192	1,211	2,407
Baths, washhouses and open bathing places	316	339	427	646	791	952	570	1,156	2,458	3,256
Parks, pleasure grounds and open spaces	2,033	1,401	2,093	2,641	2,221	1,337	1,649	2,595	3,779	5,715
Other items	481	585	675	687	662	678	1,060	1,257	1,818	2,510
National assistance—accommodation and welfare	2,973	2,661	2,386	2,974	2,711	2,629	2,737	4,086	4,909	6,533
Child welfare and child life protection	1,203	1,044	917	889	617	479	646	862	669	731
Housing (including small dwellings acquisition) (*)	342,935	373,796	360,184	349,214	338,340	309,938	286,013	331,180	345,643	399,387
Allotments and small holdings	888	1,208	1,315	1,325	906	936	609	630	968	1,248
Land drainage, river conservancy, etc. and coast protection	4,046	13,934	6,970	6,804	5,400	4,971	5,111	5,416	5,417	6,771
Highways, bridges and other works on private streets	6,261	6,504	8,055	10,780	13,478	15,117	20,983	26,540	31,715	35,737
Private streets widening and other works on private improvement	1,390	1,553	1,779	2,302	2,379	2,667	2,766	3,347	3,323	3,754
Public lighting	1,178	1,550	2,251	3,314	3,716	3,116	2,814	4,415	5,091	5,780
Fire service	1,470	1,738	1,677	1,869	1,676	1,236	1,696	2,301	2,143	2,597
Police	6,056	6,332	6,068	6,348	5,543	4,299	4,047	3,659	3,594	4,976
Administration of justice	230	72	171	155	291	153	492	472	947	899
Trading services:										
Water supply	23,466	24,750	23,674	24,362	28,273	25,782	26,077	28,069	31,664	34,413
Passenger transport	3,660	4,819	3,027	3,726	4,432	3,249	3,000	2,298	1,705	1,712
Canals	453	550	517	517	812	790	851	1,003	1,266	1,660
Harbours, docks, piers, etc.	4,586	5,204	4,996	5,680	6,733	5,392	7,470	7,396	6,177	7,794
Other trading services (including corporation estates, ferries, markets and civic restaurants)	3,109	2,337	3,889	5,042	4,700	5,238	6,604	7,220	10,202	15,492
Civil defence	85	167	155	174	284	168	135	118	227	249
Emergency services other than civil defence	51	34	65	12,661	12,363	9,583	9,598	14,290	18,851	26,520
Other works and purposes	11,515	11,442	10,725	12,661	12,363	9,583	9,598	14,290	18,851	26,520
Expenditure not allocated to specified services	1,267	1,479	1,561	2,824	2,806	3,092	3,452	3,751	6,351	7,271

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